# NATURAL HISTORY ESSAYS

*RENSHAW*

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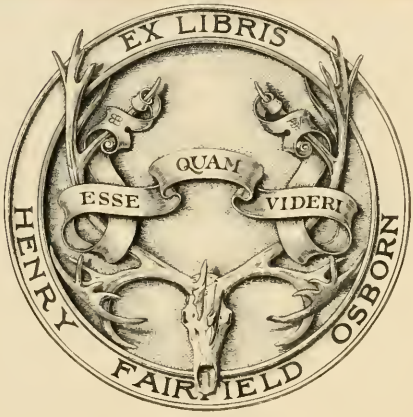


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# Natural History Essays

PAPYRUS REEDS.

# Natural History Essays

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BY

GRAHAM RENSHAW, M.B., F.Z.S.

*ILLUSTRATED*

Sherratt & Hughes
65 Long Acre London W.
27 St Ann Street Manchester
1904

To my Father

NORTHERN GIRAFFE.

Note the stoutly formed muzzle, the large angular spots and the unspotted legs. In galloping the head swings rapidly up and down and the tail is either curled up over the back or is switched from side to side—hence not seen in this illustration.

# PREFACE.

THE kind reception accorded to certain lectures and magazine articles has encouraged the preparation of this little work. In it an attempt has been made to describe typical examples of the mammalian fauna of Africa as seen both from the zoological and the historical standpoint. The information upon which this book is based being the outcome of several years' investigation, research, and correspondence, I hasten to express in this place my grateful thanks for many courtesies received from various scientific gentlemen, not only in this country but also in America, Africa, and on the Continent of Europe.

GRAHAM RENSHAW.

SALE BRIDGE HOUSE
SALE, MANCHESTER
*July, 1904*

A HERD OF SING SING WATERBUCK.

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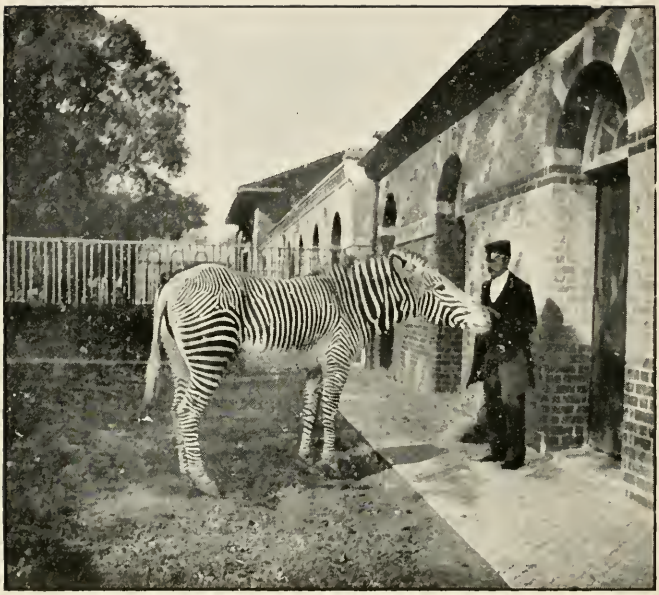

A TAME GRÈVY'S ZEBRA.

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# THE BARBARY APE

A YOUNG BARBARY APE.

# THE BARBARY APE.

"*Africa semper aliquid novi offert.*" Truly, even to-day, the words of Pliny hold good: Africa's rich store of animal life has not only afforded many surprising novelties in the past but even yet is apparently unexhausted.[1] It is quite possible that many forms of the highest interest still await discovery. The list of remarkable mammals inhabiting Africa is so long that but few can be mentioned here: we may, however, instance as examples the gorilla, the potamogale, the Burchell zebra, the sable antelope, the pigmy hippopotamus, the fringe-eared oryx, and the Somali giraffe. Every one of the foregoing animals has only become known to Europeans within the last hundred years; the Romans were, however, familiar with a considerable number of African mammalia, such as the lion, leopard, elephant, and common hippopotamus, whilst the addax (*strepsiceros* of Pliny), the leucoryx, and the black rhinoceros were also known to some of the older writers. One animal, familiar to both ancients and moderns, has persisted throughout a great portion of its original habitat during all the long

[1] Witness the discovery of Grévy's zebra in 1882, of Hunter's hartebeest in 1888, and of the okapi in 1900.

centuries which have elapsed since Roman times, and is a form of considerable interest. I refer to that well-known species—the Barbary Ape.

The Barbary Ape (*Macacus innuus*)—pithecus of the ancient Romans—πίθηκος of the ancient Greeks—magot of the present day French—is a stoutly built muscular animal about as large as a moderately sized dog. The face is surrounded by a semi-ruff of elongated hair: the eyes are hazel-brown, close together, and deeply set in the head; each ear has a small tuft of upright hair springing from its root. The muzzle protrudes slightly. In colour the Barbary ape is brownish grey paling to dirty white beneath: on the forehead the fur tends to an orange tint, and there is a yellowish suffusion noticeable on the facial ruff and the shoulders. The face itself, the soles of the feet, and a small patch on each buttock are flesh-coloured. There is some individual variation amongst these monkeys, the fur of some specimens inclining to a reddish-brown colour, while that of others approximates to olive-green.

The tail of the Barbary ape is a mere tubercle of skin: this is an interesting fact since so many of the macaques (to which division of monkeys the present species belongs) have long tails. One can even trace a distinct gradation in the length of this appendage. Thus in the well-known

bonnet monkey the tail is about twenty inches long, or equal to the combined length of the head and body; in the equally well-known rhesus it does not exceed half this measurement, and in the East Indian maimon the pig-like tail is only one-third as long as the head and body together. Continuing this investigation, the brown macaque is found to possess a mere two-inch stump, thus bringing us to the Barbary ape, which is practically tailless. It is therefore evident that but little importance can be attached to the length of the caudal appendage in classifying monkeys, since all the macaques, in spite of the varying length of the tail, are very closely allied, as is seen not only from their other external characters but also from their internal structure.

The history of the Barbary ape stretches far back into antiquity. The date of its discovery by Europeans will probably never be known: but Aristotle (B.C. 384-322) describes the πίθηκος in his great work on the history of animals (περὶ ζώων ἱστορία), remarking that it is a hairy-coated animal and that it "passes more of its time as a quadruped than a biped" in obvious allusion to its baboon-like habit of going about on all fours. Galen (130-200 A.D.), honourably known as the industrious author of at least eighty-three treatises, on medicine and allied subjects, has left an account of the anatomy of this monkey: for the student will

find that, although this writer's περὶ ὀστῶν τοῖς Εἰσαγωγενοις (De Ossibus ad Tirones) contains a fairly accurate description of various bones, the objects thus described are, in many instances, not human, but simian. Coming to recent times, it appears from an old paper in the British Museum, quoted by Captain Sayer, that the Barbary ape certainly inhabited Gibraltar as early as 1740, in which year a large number were imported: a poll-tax was instituted on "apes, Jews, Moors and other aliens!"

A few weeks before the famous siege of Gibraltar (1779-82) the Spaniards attempted to surprise a British outpost: but the apes of the Rock played the part formerly enacted by the geese of the Capitol, for by their cries they gave the alarm to the British, who promptly repulsed the enemy. Successive garrisons at Gibraltar took considerable interest in the wild monkeys, and, indeed, General Elliott (afterwards Lord Heathfield) never allowed them to be captured or even molested. The apes were hence very numerous in the old days, wandering about in several troops: however, at last, they became so destructive to the fruit gardens that the protection was withdrawn and they were destroyed by trap and poison almost to the point of extermination. In 1856 the surviving monkeys (only some half-dozen all told) were again protected, and in 1863

fresh blood was introduced from Africa by Gen. Sir W. Codrington, the total number in 1864 being about a dozen individuals. Since then, the Gibraltar apes have increased slowly: in 1875 they consisted of eight adults with several young ones, and in 1880 they numbered twenty-five all told.

Although some naturalists have assumed the Gibraltar colony to be a last survival of the numerous bands of Pliocene times, it seems that Africa and not Europe is the true home of the Barbary ape. Mr. Busk, who found plenty of bones of the serval cat and other North African species in the ancient breccia of Gibraltar, failed to discover any remains of *Macacus innuus*, and concluded that the Rock monkeys had been *imported*—comparatively recently—from across the straits. In Africa the Barbary ape occurs in Morocco and also in Algeria, from the Chiffa River as far as the eastern boundaries of Kabylia, being thus widely, if not abundantly, distributed. The pretty little village of Stora, near Philippeville, is now known chiefly as a charming resort for tourists, and also as a centre for the sardine-curing industry: in earlier times, as Desfontaines found at the end of the eighteenth century, it was remarkable rather for the troops of wild monkeys which covered the trees with their swarming numbers.

Since then the partial destruction of the North African forests has diminished the range of the Barbary ape; it still occurs, however, in many places in Algeria and Morocco, where it inhabits rocky situations, more or less covered with trees and bushes, though I have no information of any survivors still occurring at Stora. The best known haunt of these monkeys at the present day is the Gorge of the Chiffa, near Blidah, in Algeria, where the animals are often seen in considerable numbers.

In June, 1903, a visit was paid to the Ruisseau des Singes, a mountain stream situated in the heart of the Gorge. Setting out at half-past seven in the morning from the pretty little town of Blidah, embowered in groves of orange and citron, we drove along the white, dusty, cactus-fringed road, which led from Blidah to Medeah. A blue haze obscured the lofty peaks of the Atlas mountains on the one hand, and the fair plateau of the Sahel on the other, while between the two lay the fertile Metidjeh plain, and over all hung the turquoise sky of Africa. At a distance of four miles from Blidah an iron bridge spanned the Oued Chiffa, in summer a mere stream passing over a rocky bed, far too wide for it, but in winter a fair-sized river. The Gorge of the Chiffa—an enormous rent in the Atlas extended for ten miles into the heart of the mountains. The scenery was

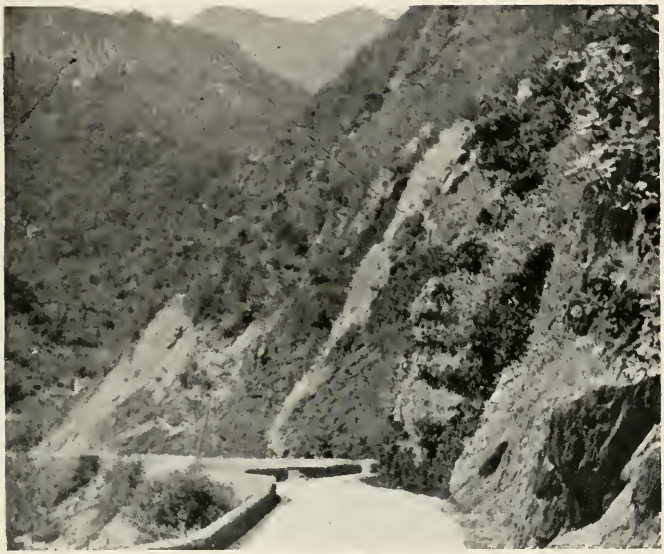
THE OUED CHIFFA IN JUNE.

Like many other African rivers in summer the Chiffa is a mere stream, coursing over an almost dried up bed. The apes are said to descend to drink here night and morning.

magnificent in the extreme, consisting of steep, precipitous rocks, tinted with various shades of purple, slate, and brown, and thickly covered with luxuriant vegetation : while at intervals numerous cascades discharged themselves into the Chiffa. This romantic district abounded in wild life : the Algerian chaffinch, the blue thrush, the rock swallow, the rock dove, and other interesting birds were seen, while high above a couple of buzzards circled in the cloudless azure. The first monkey was noticed sitting close to the road with such confident tameness that it was difficult to believe that it was really a wild animal : several others were observed in the Gorge itself scrambling over the rocks on all fours and climbing into the trees. Most of the animals, however, were seen in the neighbouring Ruisseau des Singes.

The Ruisseau des Singes is a little stream situated in a ravine, whose rocky sides are if possible even more luxuriantly clothed than the Gorge of the Chiffa with which it is continuous. Ferns and lycopodiums, olive and bay trees, lentisk and juniper grow in rich profusion, while the botanist will also recognise here the curious tree-heaths so characteristic of African mountain scenery. The Barbary ape was abundant at the Ruisseau. There were sturdy old males whose powerful jaws were capable of inflicting a severe bite : female apes also appeared with their young

ones either clinging underneath the mother's chest or perched on her shoulder. The monkeys would allow a fairly near approach when high up in the trees. They silently occupied themselves in stripping off and eating the leaves or berries from the branches: there was no quarrelling or chattering as might have been expected from the behaviour of menagerie animals. Fourteen individuals were seen between half-past eight and half-past ten on that June morning. The monkeys seem to lie down during the heat of the day: certainly several of them appeared to be taking shelter from the sun, and they are said to be difficult to find after eleven o'clock. The Arab guide was quite proud to be able to point out the monkeys, and even endeavoured to assist with the camera. It is strictly forbidden to shoot any of the animals: a few young individuals are however captured from time to time, and find their way into European Zoos.



THE HOME OF THE BARBARY APE.

*Poeta nascitur non fit.* Similarly, he who would in the true poetic spirit enter Nature's fairyland, must ever possess the seeing eye and the receptive mind. The true naturalist opens out a world of wonders in exploring the animal kingdom, and—especially if he extend his researches to other lands than his own—will continually discover new realms of ever-increasing delight.

The wonderland of Africa is especially rich in the romance of natural history. The habits of the remote and formidable gorilla are fully as interesting as any legend of the doings of a forest-dwelling ogre; perhaps on account of the alleged ferocity of *Gorilla savagei* such comparison is not unapt. The Horses of the Sun, if unable to soar like Pegasus, are nevertheless still as handsome as in the days of Severus, and very much alive, though known in these prosaic days as zebras. The oryx antelopes—swift, strong, and of striking appearance—are more worthy of attention than the fabulous unicorn, of which they have been supposed to be the originals: the Red Sea dugong is a very interesting, if not very beautiful, substitute for the mermaid: while we may fancifully

liken the fleet-footed jerboas of the Sahara to wee sprites of the desert, and the large-eyed galagoes to nocturnal hobgoblins. This last similitude appears to have strongly commended itself to the mind of the black man, since in Uganda the natives believe the nocturnal cries of the galagoes to be the voices of devils.

Galagoes are the only long-tailed lemurs which inhabit the mainland of Africa, the remaining tailed species being almost exclusively natives of Madagascar. Varying from the size of a cat to that of a rat, these African forms are remarkable for their enormous ears, which can be folded up at will of the animal, to lie pressed more or less closely to the sides of the head.[1] Galagoes are also characterised by the great elongation of the upper part of the ankle, a peculiarity, however, which they share with the allied mouse-lemurs. There are several species : perhaps the best known is the pretty little animal known as the bush baby.

The bush baby or Maholi galago (*Galago maholi*) —nacht apje of the Boers—is about the size of a large rat, and occurs in Uganda, in Nyasaland, and in South Africa, as far down as Natal. The head of the bush baby is rounded and almost cat-like in expression, with large eyes of a beautiful

[1] The appearance of the larger galagoes is uncanny in the extreme. One in the Antwerp Zoological Gardens, as it sat on its box with its enormous bat-like ears covering the sides of its head, and its great eyes staring forward, seemed to resemble some weird gnome, squatting in a haunted dell, rather than any creature of flesh and blood.

topaz yellow, striated with delicate lines. The ears, as in all the galagoes, are thin and membranous: the fur is thick and soft, and the tail long and ample. The general colour of this interesting little animal is pearly grey above, passing into white below: the nose, cheeks, and throat are white, and the insides of the limbs yellowish, while the ears, hands, and feet are flesh-coloured. *Galago maholi* exhibits a certain amount of variation: the fur on the back is as a rule of a darker grey than the rest of the pelage, but some specimens have in addition blackish rings round the eyes. Naturalists have not yet decided whether the bush baby is identical with the galagoes of Senegal and Sennaar (*G. senegalensis=sennariensis*): but when a larger amount of material has been received by museums of natural history, the comparison of a long series of skins and bones will enable the matter to be satisfactorily decided.

The bush baby was first described by Sir Andrew Smith, who discovered it near the Limpopo River, in what is now the Rustenberg district of the Transvaal. A preliminary account of the new animal was drawn up by Sir Andrew in 1836, and on the publication of the scientific results of the great expedition which he had so ably directed, he figured *Galago maholi* in his "Illustrations of South African Zoology." Smith's figure will perhaps be familiar to many naturalists, as it has

often been reproduced in scientific works; not so well known in all probability are the excellent series of anatomical drawings made from dissections of the ample material—nine specimens—obtained by the expedition. On his return to England, Sir Andrew brought home a male specimen (in which the eyes were not encircled by rings), and this example is now in the National Collection.

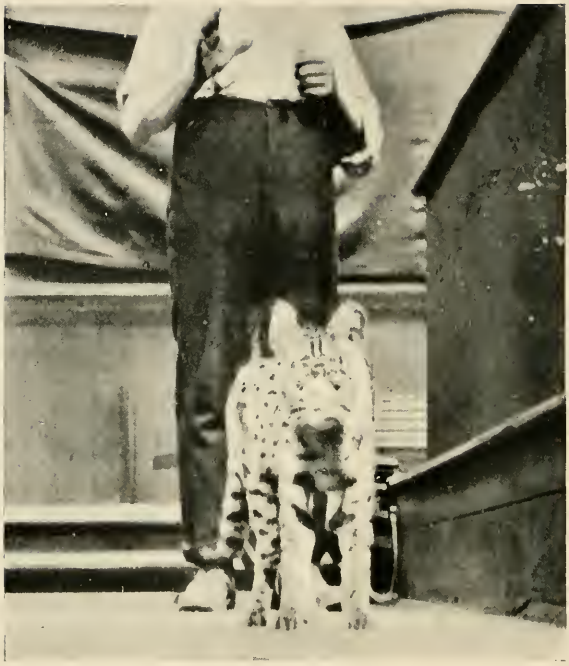
The gradual spread of civilisation since 1836 has considerably increased our knowledge of the bush baby, since its haunts—many of them in Smith's day situated in "the far interior"—have now been largely invaded by colonists, both Boer and Briton. The bush baby is purely arboreal and nocturnal, sleeping through the hours of daylight with head tucked in between the forelegs, and its long tail wrapped round: at night it becomes very active, calling loudly at sunset, and industriously searching for insects and fruit on which to feed. Galagoes are remarkable for their nocturnal activity, being able to clear several feet at a bound, and clinging to any object against which they may impinge with a sudden and surprising tenacity resembling that of a tree frog alighting on a branch. These lemuroids really appear to be capable of exerting some suction action with their digits. Mr. Murray's captive *Galago demidoffi* on one occasion easily adhered to a cylindrical glass shade, though unable to embrace even a third of

its circumference : its hold did not relax for some time, when it began to slide slowly down the glass surface. Unfortunately all the galagoes which I examined for the purpose of this book were too wild to be handled, so that it was not possible to demonstrate the existence of suctorial discs at the ends of the toes : but a careful scrutiny of the allied tarsier of Celebes (from a specimen preserved in the Manchester Museum) seems to indicate that the digits of the bush baby may be provided with such structures. Although able to clear several feet at a single bound, the bush baby alights gracefully and without noise : the long tail probably acts as a counterpoise to the head and body during these aerial gymnastics. When on the ground galagoes sit in an upright position. They can leap six feet or more "from a stand :" one individual which I recently saw could thus easily reach a horizontal bar situated high above its head. When disturbed, these animals make a low, chattering noise, and Sir Andrew Smith states that the bush baby can grimace like a monkey.

These small galagoes are usually found in pairs, and are frequently taken alive by the bush-veld Boers ; when tame they make charming pets. Many examples have been brought to England, and no less than seven specimens were exhibited in the London Zoological Gardens between 1866 and 1879. In captivity the bush baby may be fed

on fruit, honey, and boiled rice: it will also eat bread and milk, and even cooked meat, while its normal insect diet may be conveniently replaced by a supply of the mealworms so largely used by bird-fanciers. One can hardly realise that so innocent-looking an animal as the bush baby is, in its own feeble fashion, a beast of prey; but in captivity these wee creatures will not refuse a dead sparrow, and when wild probably catch and kill small birds for themselves.

The bush baby has bred in captivity, not only in Africa, but also on two occasions in England. The normal number of young at a birth is two, though sometimes there is only one: the infant galagoes are long-coated, and grow but slowly, taking two years, or even longer, to attain maturity. The Jardin des Plantes Museum at Paris contains, amongst other treasures, a young galago—a queer, rat-like little creature, scantily clothed with long hair, very unlike the close-set chinchilla-like fur of the adult.



SERVAL CAT.

## THE SERVAL CAT.

The study of the lesser Felidae or tiger cats, although undertaken by few, save professional naturalists, is interesting even to the general reader, on account of the remarkable diversity of appearance and disposition amongst the animals concerned. As regards bodily contour, one finds every modification of outline from the short, stumpy figure of the flat-headed cat of Sumatra to the elongated curves of the snake-bodied eyra of Brazil. The texture of the coat ranges from the short, coarse fur of the fishing-cat to the silky, yet shaggy, pelt of the manul, fit covering for a denizen of the snowy steppes of Siberia; while in coloration these felines exhibit an extensive variety of hues—silvery grey and warm chestnut, bright fulvous and pale isabelline. There exist also great differences of disposition, even amongst individuals of the same species, one animal hissing, spitting, and savagely resisting every attempt to tame it; whilst another proves amenable to kindness, and well repays the care bestowed upon its welfare, in captivity. All these interesting points may be readily studied by taking a particular species for detailed examination; for this purpose we may select one of the best known of the lesser *felidae*—the serval cat of Africa.

The serval (*Felis serval*) is widely distributed throughout the Dark Continent, although less abundant in the North, and absent from the Congo Forest region. About the size of a moderately large dog, this species is remarkable for its large ears, its long legs, and its short, bushy tail; these three characters combined giving the animal a remarkably lynx-like appearance. The face of the serval is very short from before backwards; the eyes have an oblong pupil, and are obliquely set in the head. The ears are upright, and placed closely together, touching each other at their bases; they resemble cones of paper in shape, and are lined inside with long hairs. The rump is much higher than the shoulders—a character which is frequently overlooked, since *Felis serval* is often inaccurately mounted by taxidermists, who represent the shoulders as the higher of the two.

In coloration the serval varies as much as any other tiger-cat. The ground color ranges from a brownish-grey (which is sometimes so pale as to be almost silvery) through fulvous to a warm orange-tawny. The ornamentation consists of a few bold, black streaks about the head and neck, the rest of the body being decorated by black spots, which may be either large and few, or small and numerous. There is always a whitish band on the back of the ear, and two broad, black stripes

on the inside of the fore-leg; the throat is crossed by a more or less well-defined row of small spots, which may coalesce in necklace fashion.[1] The tail is always ringed and tipped with black.

The above paragraph describes a typical serval as far as such a varying species can be reduced to a common denomination; there exists, however, a smaller variety, which Burchell, who discovered it in 1812-14, described as a separate species, under the name of the black-footed cat *(Felis nigripes)*. This black-footed serval is smaller than the typical form, and is deeply marked with black on the lower parts of the body, the legs and the soles of the feet. It is now a rare animal; an old specimen obtained at Kuruman many years ago by Dr. Moffatt is in the South African Museum at Cape Town, and has been figured in Mr. W. L. Sclater's "Mammals of South Africa." The British Museum has an example, and it is also represented in the collection at Berlin. The serval seems to be rather liable to melanism, since several individuals have been shot having the whole fur of a brownish-black, though the spots can be detected in certain lights. On the other hand, this protean species may show a tendency towards reduction in the size of the black spots, thus approximating to the closely allied Servaline cat *(Felis servalina)*.

1 These throat markings may be compared to the "Lord Mayor's Collar" seen on well-bred Persian cats.

The first recognisable description of the Serval appears to be that of Kolben in 1731. Dr. Sparrman, the Swedish naturalist, who travelled through a portion of Cape Colony during 1772-6, identified the present species as the serval cat of Buffon and brought home a couple of skins ; since then various travellers have met with the animal,[1] though on account of its nocturnal habits but little is known about it. The serval is said to frequent long grass near rivers in South Africa, whilst in Algeria[2] it is stated to hide away during the hours of day-light amongst tamarisk and other bushes. It is known to hunt in couples, and can fairly run down its prey, which consists of small mammals, or even young antelopes ; birds also form a considerable portion of its diet. From observations on captive animals the serval seems quite at home perched on a branch, and will squat comfortably on elbow and hocks like a great tom-cat. Serval skins, together with those of the caracal lynx (rooi kat of the Boers) and of various antelopes, are used for making karosses or native cloaks ; in some districts, as has long been known, only youths of Royal houses are allowed to wear the spoils of the serval. Further information on the habits of this and other lesser *Felidae* would be very welcome ; most sportsmen, unfortunately,

1 The first naturalist to figure the serval was Schreber, who in 1778 published an illustration of it in his work on the Mammalia.

According to Heuglin, the Arab name of the serval is "Badj."

consider them as little better than vermin, and take no trouble to learn anything about them.

Apparently the first serval brought to Europe alive was the young male described many years ago by Cuvier. This individual was as playful as an ordinary kitten, chasing its tail and rolling objects about with its paw ; it seems to have exhibited none of the fierceness popularly associated with the name of tiger-cat. Since Cuvier's day many servals have been brought to Europe for menageries and zoological gardens; indeed, it appears to be the most abundant of the lesser cats except, perhaps, the American ocelot *(Felis pardina).* Judging from the lists regularly issued by the various wild beast merchants to advertise their stock, barely three months pass without one or more individuals being offered for sale. Eleven examples were exhibited at the London Zoo between 1853 and 1879 inclusive, and I never recollect to have visited those famous Gardens without having seen at least one specimen there. In June, 1893, *Felis serval* was represented in the Regent's Park Collection by a half-grown kitten, as playful as the one described by Cuvier. It continually tossed its meat up in its paws and played with its apology for a tail. This individual had the spots along the back almost confluent, but the "necklace" was indistinct.

The temper of the present species is as variable

as the markings of its skin, and great individual differences in disposition and tractability may be recognised. Many servals are the reverse of amiable, snarling and spitting if their cage is approached too closely, and ready enough with teeth and claws to resent aggression : it would go very hard with the pluckiest of terriers if thrown into a cage with one of these savage brutes. This ferocious disposition is not limited to the adults for it may be evident enough in mere kittens, although by reason of their voyage to Europe all foreign animals of necessity become accustomed to the presence of human beings. Truculent, agile, with muscles as supple as steel, it is quite conceivable that a serval driven to bay would be no despicable antagonist for an unarmed man.

Nevertheless although it is plain that individual animals can be incarnations of brute ferocity it is not fair to libel the whole serval race as utterly untameable and hopelessly savage, as too many naturalists have done. "Give a dog a bad name" is a proverb equally applicable to cats, even wild ones ; it must be borne in mind, by the way, that the name "tiger-cat" refers chiefly, if not wholly, to the tiger-like *markings* which adorn most of the group, and not to the tigerish *nature* of the animals.[1] Repeated observations in Continental

[1] Compare also the adjectival use of the word in the case of the readily-tamed "tigrine" genet of the Cape, and of the Tasmanian "tiger".wolf or thylacine, which becomes at least half-tame in captivity to my own certain knowledge.

and other Zoological Gardens will demonstrate the fallacy of many popular ideas concerning the mammalia. Thus the (alleged) intractable zebra may be as docile as a pony ; the mild-eyed eland is by no means to be trusted ; the savage sable antelope can be half-tamed, and the lynx, although naturally as fierce and as strong as a leopard, will sometimes allow himself to be pulled about like a huge, over-grown kitten. As regards *Felis serval*, it must be remembered that *all* wild animals act on the defensive in the presence of man, whom they instinctively fear as a common enemy ; only those individuals whose minds are naturally impressionable will become tame, the others, from some unknown factor, remaining savage, even after long confinement. A half-tame animal may be amiable towards those it knows, but vicious towards strangers ; this may be illustrated by a typical instance.

A young serval had been brought to Europe from Uganda, and in consequence of much attention, became strongly attached to its keeper, who soon had his pet docile, tame, and indeed affectionate—all that could be desired. The attendant, having had occasion to go out, left me with the serval loose in the room. Shut up with a stranger, the animal at once lost his wits, and retreated into a corner. On advancing towards him, he bristled up angrily, snarling like a leopard ;

yet curiosity prevailed over his surly temper, and he would take occasional peeps from his hiding place to see if he was alone. The keeper returning, the serval ran to meet him with evident joy, rubbing against his leg like a cat, and feeding readily from his hand: indeed, the same animal was coaxed a few moments later to stand for the photograph reproduced in this book. The above instance illustrates admirably the uselessness of trying to estimate an animal's character from a casual inspection of a single individual: had more care been taken by the compilers of the older Natural Histories, we should have had fewer stories of the "savage" and "untameable" nature of many a score of animals.

A very good-tempered and handsome serval was, until recently, living in a well-known Zoological Garden; he was delightfully tame, taking notice of anybody, and showing every sign of delight when stroked. This animal may be taken as illustrating *Felis serval* at its best, a big, good-natured playfellow, full of animal spirits, and as anxious to be noticed and petted as any dog could be. It seemed that this individual had had his misfortunes, judging from the crumpled state of one ear, which was either malformed or had sustained some injury; nothing, however, appeared to ruffle his sunny disposition, or to bate his unabashed friendliness. In contrast to the

amiability of this individual, one may mention the savage temper of two half-grown kittens, now in the same collection: these young servals, though barely half the size of their predecessor, are vicious enough, and ever ready to spit and snarl.

No account of the serval would be complete without a short notice of the servaline cat of West Africa (*Felis servalina*), a form so closely connected with the present species that it is doubtful whether it is not a mere variety of it, like the black-footed cat. It has already been mentioned that some servals have the spots small and numerous, instead of few and large; this is exactly the case with the servaline cat, but the diminution in the size of the spots is carried a degree further, the skin being profusely ornamented with a multitude of minute black dots. A comparison of living *Felis serval* with living *Felis servalina*, side by side, reveals but little real difference between the two, save for the shorter tail of the latter.[1] The servaline cat has a few bold, black markings about the neck and throat, and the tiny black spots are distributed over a ground colour of greyish brown; the whitish band on the back of the ear, and the black stripes on the inside of the fore-leg, which occur in the true serval, are also found in the servaline cat.

1 The iris is greyish yellow in young *F. serval*, and pure yellow in adult *F. servalina*. A direct comparison of the eyes of the two species at the *same* age would be very instructive.

The name *Felis servalina* was proposed in 1839 by Mr. Ogilby, the species being founded on an imperfect skin received from Sierra Leone. Little was known about the animal for many years; but on June 15th, 1874, an example was trapped at Kisembo, in South-west Africa, and brought home alive by Mr. Shield, who presented it to the London Zoological Gardens. A second example was received in the Zoo in 1876, having been presented by Lieutenant V. Lovett Cameron; and a third was purchased in 1880 for exhibition in the same famous menagerie. In 1889 a fourth *servalina* was living in the Amsterdam Zoological Gardens. A specimen of this very rare cat received from Uganda was added to the Regents Park collection in June, 1898, and still flourishing in the small cat's house. This example is extremely amiable and fond of being stroked. Its fur seems to lack the greyish tinge often seen in the true serval but the necklace and other markings are well defined.

The above account practically completes our present knowledge of the serval and servaline cats (if indeed the latter be distinct); enough, however, has been said to show that even the obscurer animals of Africa well repay the attention of the student, not only on account of the strangeness of their external appearance, or the variability of their colouring, but also because an examination of *living* individuals imparts a good education in animal psychology. In the course of this Essay

we have seen that individuals of the same species living under the same conditions exhibit a marvellous disparity in temper, one animal repelling all offers of kindness, whilst another courts attention and receives caresses with a graciousness not to be rivalled by the most pampered of domesticated cats. It is the study of the *mind* of an animal, the investigation of the dumb intelligence which operates somewhere within the bodily frame-work of the brute which must ever constitute the most enchanting field of zoological research, a quest compared to which the most masterly treatise on comparative anatomy, or the most scientific scheme of classification, can only resemble the description of some soulless mummy or the terse lettering inscribed on a sarcophagus. The remarkable lynx-like appearance and handsome coat of the serval attracts the observer's attention at once, whilst the comparative frequency with which it is offered for sale is an additional reason for supposing that some day the study of the animal may be more fully undertaken. In its wide range, in its tendency to individual variation, both in colour and disposition, *Felis serval* is one of the most interesting of all the tiger-cats; and any naturalist who takes up that neglected though fascinating branch of Natural History—the study of the lesser *Felidae*—will find it full of an enchanting interest, and one, which once fairly commenced, will not readily be abandoned.

# THE SENEGAL GENET.

Throughout the animal kingdom there exists a remarkable modification of the external forms of the various species to the contour which best fits them for the conditions under which they live. By merely examining the dead body of an animal its habits can be determined with considerable accuracy. On the other hand, from fore-knowledge of its mode of life, one can predict the external appearance of an animal before it has been seen. Thus amongst the mammalia fleetness of foot is often associated with length of limb, as is seen in various deer and antelopes; aquatic animals are provided with natural paddles as in the seals, or with effective screw-propellers like the hind feet of the water-shrew; whilst those forms which live on a special diet are duly provided with proper tools for obtaining it, as we see in the elongated tongue of the giraffe, the prehensile lip of the black rhinoceros, and the burrowing claws of the ant-bear. The insectivorous otter[1] shoots through the clear waters of the West African streams impelled by its long supple tail, and protected from drowning by the valves closing its nostrils. The sluggish

1. *Potamogale velox;* a very rare insectivore, remarkable for its very broad muzzle, its valvular nostrils, and its long compressed tail.

manatee (strange contrast to the alert otter) lazily browses upon the aquatic plants, its rotund body comfortably sheathed in a warm covering of blubber, and its short, though powerful paddles, acting as perfect oars. Amongst the carnivora the lion, the leopard, the serval, in fact all the cat tribe, are furnished with pads on their feet to enable them to steal noiselessly upon their prey, while they are also provided with powerful talons to hold it when captured, and with roughened tongues to rasp the meat off the bones of their victim. The *viverridæ* (civets, genets, and mongooses) are closely related to the cats in structure, and by reason of their elongated bodies, also bear considerable superficial likeness to the *mustelidæ* or weasels, which they resemble in habits. Many viverrines indeed are as expert hunters as the true cats or the true weasels. A good example of the *viverridæ* is seen in the Senegal genet (*Genetta senegalensis*)[1] of West Africa.

Few of the carnivora are as elegant in proportions or in markings as the Senegal genet. Its pointed muzzle, short legs, and elongated body at once indicate it to be an animal accustomed to prey upon small victims (such as mice), which harbour in holes and crannies, the suppleness of its body well guaranteeing its capacity for such an

1 The Senegal genet is also the *Genetta pardina* of M. Isidore Geoffrey St. Hilaire = the "pardine genet" of menageries.

occupation. The fur of this genet is yellowish-brown, richly spotted and streaked with blackish brown; a black line runs along the spine, and the tail is alternately ringed with black-brown, and yellowish.[1] An examination of the foot will show that *G. senegalensis*, like the other genets, has a bare space extending some distance along the under surface beyond the foot-pads. The scent gland of the closely-allied civet cats (once famous for their perfume) is represented in the genets by one or two folds in the skin; at the bottom of these folds are a number of minute orifices which exude an odorous substance.

The Senegal genet was first known to science from a specimen received from M. le Coupet by the Paris Museum, but the relationship of the various species to each other has not yet been worked out, though obviously all the forms are very closely allied. Owing to their nocturnal habits, but little is known of them in the wild state: they are, however, stated to climb well, and to feed on birds and mice, which they hunt for diligently, prowling about in the long grass, An example of *G. tigrina* gave birth to three young ones at the London Zoological Gardens, on July 29th, 1874, and amongst the specimens sent home by the late

1 The Senegal genet is a very variable species, and divisible into several local races occurring in various parts of tropical Africa. A fine male specimen of the Dongolan race, taken in the hill country of Erkoweet, near Suakin, lived for several years in the London Zoological Gardens.

Emin Pasha in 1887, were the skins of a female *G. tigrina* and her young one, the latter being one of three which had been found in a nest at Lado, on the Upper Nile. The following notes refer to a very fine male sent to Liverpool in 1901.

During the day-time the animal remained more or less drowsy, and slept coiled up in his travelling box, but awoke at twilight, when he came out, and became exceedingly active. Any person observing this species in captivity will be struck with the marvellous activity and lithe, serpentine grace with which it moves, springing like a cat from place to place, or running across the floor like a streak of lightning. Genets have a curious habit of continually bounding to and fro behind the bars of their cage, performing the task with clock-work regularity, like wound-up automata.[1] In the living animal the head has a remarkably deer-like expression, whilst the graceful carriage of the elongated and tapering tail adds considerably to the creature's elegant appearance. The movements of a genet are as noiseless as those of a cat, and are due to the same cause, since in both animals each toe is padded underneath, whilst the sole of the foot is also provided with a similar though larger cushion. Not only is the genet noiseless in its movements, but the individual here

[1] The fine example now living in the small Cats' House at the London Zoological Gardens, affords a good illustration of this peculiarity.

described never uttered any cry. Perhaps this was because he was never teased or irritated, since wild genets when attacked by dogs are stated to hiss vigorously, and an example, recently living in Paris, would snarl at once if disturbed.

Captive genets soon become very tame. The Liverpool specimen would allow himself to be stroked and fed readily from the hand before he had been eight weeks in England. On one occasion his good temper was rather severely tested, for it being desired to restore him to his cage (he being unwilling) it took three-quarters of an hour to secure him without injury ; nevertheless, though thoroughly frightened, he neither uttered any sound nor made any attempt to bite. He was fed on fish, mice and fowl's heads ; he seized his prey with a sudden snap of the jaws (weasel fashion) instead of pouncing upon it like a cat. This genet remained in excellent health after his arrival in England, never having a day's illness, showing the slightest ill-temper, or making any attempt to escape from his roomy cage. He was, eventually, sent away in the pink of health and condition, "leaving situation for no fault of his own," being exchanged for a nankeen night-heron *(Nycticorax caledonicus)*.

It will thus be seen from the above account that the Senegal genet makes an almost ideal pet. Not only does the animal well repay the trifling

amount of attention it requires by the continual pleasure of observing its beautiful form and graceful movements, but it may also be put to some practical use. When tame it may be set to a very congenial task—that of ridding premises of mice; indeed, the common genet was formerly domesticated at Constantinople (and in various other places in Europe) for this express purpose, much as mungooses are kept in England for clearing rat-infested warehouses.[1] From their great activity genets require much more cage room than is often their fortune; a run of at least nine feet by three feet, with branches for climbing exercise, should always be provided. Warmly bedded, with good hay or straw, and with a daily supply of fresh animal food and good water, the Senegal genet will live happy and contented long to delight its owner with its handsome appearance, its graceful movements, and its amiable disposition. Should any reader of these lines wish to purchase a pet which will be beautiful to look upon, easy to tame, to feed and to keep in good health—being at the same time conveniently small (size of a large ferret), and moderate in price—let him buy a genet. He will not regret his choice.

[1] This suggestion is not based on any arm-chair theory since the homing qualities of the genets have been recently put to a practical test. Mr. G. E. Powter, of Mombasa, British East Africa, has shown (*Field*, 1903), that a tame individual set free in the bush will return over a distance of half-a-mile, and re-enter the house from which it was taken three days after its liberation.

## THE FENNEC FOX.

"A Fox, very hungry, chanced to come into a vine-yard, where there hung branches of charming ripe grapes: but nailed up to a trellis so high, that he leaped till he quite tired himself without being able to reach one of them. At last, "Let who will take them!" says he: they are but green and sour: so I will even let them alone."

The above venerable fable has doubtless been employed on innumerable occasions to point a moral or adorn a tale during the long centuries which have elapsed since Æsop first related it: and it is to be hoped that much profit has accrued to those who have duly meditated on the application thereof. It is interesting to reflect that this fable has an attraction for the naturalist, as it has been considered possible that the fox mentioned by Æsop was not the common fox of Europe, but the fennec fox of Northern Africa. Be this as it may, the fennec is well known to be very partial to sweet fruit, such as dates, and may well be included amongst "the little foxes that spoil the vines." This diminutive species, apart from any literary associations, is in itself so remarkable and interesting that it is well worth studying for its own sake.

FENNEC FOX (in the Manchester Museum).

The fennec fox *(Canis zerda)* is the smallest of all the *Canidae* or dog family, measuring only twenty-three inches from the tip of the muzzle to the root of the tail: on account of its delicate outlines it is also one of the most beautiful. The muzzle of this exquisite little creature is narrow and tapering. The head is broad and rounded. The ears are upright, and relatively enormous, often exceeding three inches in length: they are shaped like paper cones and lined internally with silky hairs.[1] The legs are short: the fur is thick and the tail ample and bushy. The colour of the fennec is fawn or buff above, fading to creamy below: some specimens have the greater part of the coat pervaded by the creamy tint. A small blackish area occurs below and in front of the eye, and the tail is tipped with black, while some individuals have in addition some dark pencillings along the spine.

The fennec has long been known to Arab writers who have published descriptions of it under the name of El Fennec: it was, however, first introduced to the notice of Europeans by Bruce, who was Consul-General at Algiers during 1762-65. The specimen which he described was supposed to have originally come from Biskra,

1 The sense of hearing is probably very acute in the fennec as may be deduced not only from the large size of the external ear, but also from the great development of the tympanic bulla seen in the dried skull.

the beautiful oasis in the Northern Sahara, famous for its thousands of palm trees. Having received the fennec from his dragoman, Bruce kept it under observation for several months, and subsequently presented it to Captain Cleveland, R.N., who, in his turn, gave it to the Swedish Consul at Algiers. Bruce is said to have made a water-colour drawing of his pet, and subsequently entered into a violent quarrel with Mr. Skiöldebrand as to which of them had been the first to figure *Canis zerda*; the Swede maintaining on his side that Bruce, instead of being the original delineator of the fennec, had merely received a copy of Skiöldebrand's own drawing! A figure of the new animal, together with an account of it, was communicated by Bruce to Buffon, and was published by the French naturalist in 1786. Mr. Skiöldebrand was not backward in publishing *his* account of the fennec, which was sent to Pennant, and will be found (doubtless paraphrased) in the first volume of that naturalist's "History of Quadrupeds." A comical figure of the "Zerda" constitutes Plate LIII. of Pennant's work: the little fox of the Sahara[1] is represented as sitting on its haunches and (in spite of the due rendering of the large ears) very much resembling an overgrown rat. Although so obviously a fox, the true affinities of *Canis zerda* were not thoroughly understood

1 Skiöldebrand aptly styled the fennec "*Vulpes minimus saarensis.*"

by the early writers, and one French naturalist even supposed it to be some kind of galago—a carnivorous terrestrial species being thus mistaken for an arboreal lemuroid, allied to the bush baby already described!

A further contribution to the subject was made many years later, when a fairly good figure of the fennec (from a drawing by Major Denham) was published with the zoological report appended to Denham and Clapperton's book of travels: the report also contains a good account of the fennec. It may here be mentioned that the zoological results of this expedition were highly creditable, for though only provided with a penknife and a little arsenical soap, the party managed to bring home upwards of a hundred natural history specimens, many being in an excellent state of preservation!

In more recent times the habits of the fennec have been carefully studied. Bruce tells us that he purchased a second specimen in Sennaar: in spite of the enormous distance thus separating the homes of his two fennecs, they were both exactly alike, so that *Canis zerda* probably ranges throughout the Sahara desert. It has been found to be abundant in the date-growing districts of Beni Mzab and Ouargla, and has even been stated to climb the date palms for the sake of the fruit.[1]

[1] The fennec has here probably been confused with the palm-rat (*Mus chamæropsis*), which is often found in the tops of the palm trees in the Algerian Sahara.

The fennec constructs its own burrow, where it spends the hours of daylight curled up, with its bushy tail wrapped round it like a natural counterpane, though the large ears remain exposed. The districts of the Sahara through which I travelled were remarkable for their periodical streams which, though containing water in the winter, are at midsummer merely dried up ravines. It is along the beds of such former watercourses or in the depressions between the sand dunes that the fennec passes in seeking its drinking place at dusk, its great ears ever on the alert to warn it of approaching danger; while doubtless its acute sense of hearing is of the greatest service, as in the stillness of the desert it begins to search for its nocturnal prey—jerboas or lizards.[1]

Although Bruce's type specimen is believed to have come from Biskra (and fennecs were some years ago frequently offered for sale there), I did not observe any of these tiny foxes in the Arab market at that place. That it is still a common African species, is however demonstrated by the

[1] The utter and savage desolation of the wildernesses in which the fennec lives would almost seem to forbid any animal, however small, the means of subsistence. Even in the extreme Northern Sahara (districts of El Kantara and El Outaia) I observed but few signs of life. One or two little black-and-white birds (rock chats) at uncertain intervals: occasional parties of insects hovering in shimmering clouds above the burning sand: and high in the blazing sky birds of prey ready to pounce on anything larger than a mouse, completed the scanty picture of animal life. Vegetation was represented merely by a coarse scrub of dwarf bushes, and the scenery consisted of frowning rocks, yawning precipices, and stretches of shifting sand—a vast and awful silence reigning over all.

VIEW IN THE SAHARA DESERT.

considerable number which in recent years have been imported into Europe for exhibition in zoological gardens. Although very nervous and suspicious, when tame the fennec makes a charming pet. It has none of the disagreeable odour of other foxes, and indeed of many dogs: and its only cry is a weak bark. Care should be taken to protect the fennec from cold and damp: the food provided may consist of ripe fruit and sweetened bread and milk, varied with eggs or even meat, though the feebleness of the jaws will naturally limit the range of diet which may be allowed to this fox. Taken altogether, the fennec in captivity does not appear to exact more care than is ordinarily bestowed on delicate breeds of dogs or on prize Persian cats: and were it better known it would probably soon become popular. Whether such will be the case in the future is doubtful. Nevertheless, the jerboa rats from the same districts of the Sahara are steadily growing in public favour as quaint and interesting pets: and whether we regard the fennec merely as a curiously diminutive specimen of the vulpine race, or whether we take up in earnest the study of its ways in captivity, there will always be a delightful interest and charm attaching to the four-footed hero who figures in the fable of "the fox and the grapes."

# THE BLAAUWBOK.

Summâ cortex levis innatet undâ
Cum grave nexa simul retia mergat onus.[1]
—Ovid, *Tristia Lib. III.*

Amongst animals the larger and more conspicuous species are ever the first to be exterminated, while the small fry find their safety in their very insignificance. The great white rhinoceros, hugest of all terrestrial mammals save the elephant, has almost disappeared from Africa south of the Zambesi, though the diminutive Cape hyrax yet flourishes in its mountain fastnesses: the gigantic moa—tallest of the ostrich tribe—has vanished for ever, hounded to death by the Maories, though the diminutive apteryxes still find shelter in the ferny brakes of New Zealand; further instances might be multiplied indefinitely. In addition to large size, limitation of range seriously predisposes a species to extermination. This factor alone has had disastrous effect on many forms of very moderate size, such as the Réunion Starling, the Norfolk Island parrot, and the black emu. As examples of both agents acting in combination, one may instance the extermination of the sea-cow

[1] The light cork floats on the top of the waves, while the weighted net sinks.

BLAAUWBOK BULL (in the Leyden Museum).
The type specimen described by Pallas.

of the Commander Islands, the loss of the true quagga of South Africa, and the fate of the blaauwbok of Swellendam.

Few mammals indeed have had so limited a distribution as the blaauwbok (*Hippotragus leucophaeus*), a beautiful antelope which inhabited Cape Colony until 1800, when the last survivors were exterminated. The blaauwbok only occurred in the province of Swellendam, in the south-west of the colony, the most persistent inquiries always failing to discover it anywhere else; this unfortunate species was thus situated directly in the path of civilization, as it spread from Capetown into the savage interior, and was promptly exterminated by the early settlers, being the first of the splendid African fauna to disappear. The stature of the blaauwbok (40 to 45 inches at the withers) was also against it, for while lesser antelopes, such as duiker or steinbok, found ready concealment in the thicker bush, the blaauwbok furnished a conspicuous target for the guns of the rapidly-increasing settlers. *Hinc illae lachrymae!*

The blaauwbok was armed with a pair of stout horns, heavily ringed at the base and sweeping backwards in a curve to end in sharp points. The ears were somewhat elongated but were not pencilled at the tips.[1] The neck bore a short

[1] The essential differences between the blaauwbok and the allied roan antelope are indicated in this description.

mane directed forwards, but there was no ruff on the throat. The tail was short, tufted, and did not reach to the hocks. The general colour of the blaauwbok was bluish-grey, paling to white beneath ; the belly and insides of the limbs were also white, and the posterior portions of both fore and hind legs were paler than the anterior. The specific name *leucophæus* was conferred on the animal by Pallas on account of a whitish spot situated in front of and beneath the eye.

The foregoing characters of the blaauwbok may be studied to-day in any one of the few museums which possess a stuffed specimen ; during life, however, the animal was said to be of a much bluer colour than could be recognised in the dead skin. Pennant says, " Colour, when alive, a fine blue of a velvet appearance ; when dead, changes to bluish-grey, with a mixture of white " (History of Quadrupeds, Vol. I., p. 74). Dr. Sparrman, in mentioning the animal, says, " On this subject the reader may likewise turn to Mr. Pennant's Blue Antelope," and adds, " the colour of this creature, when alive, is said to resemble that of blue velvet, but when it is dead, it is of a leaden colour." Those who have noted the exquisite satiny gloss often seen on menagerie specimens of the allied sable antelope (*H. niger*), will readily understand that after death such adventitious hues are liable to disappear, and that the " velvety "

appearance of the living blaauwbok might be due to a similar iridescence; Le Vaillant, however, seems to have expected some visible colour-change in the blaauwbok which his attendant shot in 1781. He writes, "I did not observe, as Dr. Sparrman says, that this antelope when alive resembles blue velvet, and that when dead the skin changes its colour; living or dead, it appeared to me always alike. The tints of that which I brought with me never varied" (Travels in Africa, Vol. I., p. 133). *Post-mortem* changes of colour undoubtedly do occur in the animal kingdom, as may be seen in the lilac breast feathers of the Gouldian finch *(Poephila gouldiae)*, or in the gorgeous livery of many tropical fishes, so that Le Vaillant had some ground for expecting such a transformation in the blaauwbok; the matter, however, can be readily explained. The colour of the living *leucophæus* may have been due to the bluish *hide* showing through the hair; many antelopes, such as eland and kudu, have this appearance when age has thinned their coat, and it has even been recorded by Harris in the roan antelope, itself a near relation of the blaauwbok. Old animals would be the most likely to be dispatched by the antediluvian weapons of the colonists, and these would of course exhibit the bluish appearance in the fullest degree; hence the blue tint would first be noticed in these early

examples, and then popularly ascribed to the whole blaauwbok race. The subsequent change to "leaden colour" is easily explained by the *post-mortem* drying of the hide.

The blaauwbok was exterminated so early that but little is known of its habits. From various published descriptions of the Swellendam district, it appears that the animal resembled the sable antelope, in frequenting grassy valleys, intersected by small streams, with adjacent woodland ; we may also conclude that it resembled the roan antelope in occurring on open flats, since Le Vaillant's specimen was shot almost immediately after an unsuccessful pursuit of "gazells," which had appeared in immense herds, and were probably springbok, mammals characteristic of the open veldt. The blaauwbok, like other antelopes, was accustomed to rest during the heat of the day ; that killed by Le Vaillant's Hottentot was shot soon after it had risen to grazé in the afternoon, the sun still shining strongly enough to make it appear quite white at a distance.[1] The specimen obtained was a male, and the only one seen on this occasion ; hence it is probable that, as with other antelopes, the old bulls often wandered about alone.

[1] Mr. Selous says of the allied roan antelope : "when standing in an open plain, with the sun shining upon them, they often look almost white, which accounts for the name of *white sable antelope*, by which they are known in many native dialects. ("Great and Small Game of Africa," p. 409).

Thunberg, the Swedish botanist, has attempted to account for the rarity of the blaauwbok by quoting the colonist's belief that the females being careless mothers, the calves were often devoured by wild beasts; although this can neither be proved or disproved at this time of day, the considerable number of field notes and drawings now extant, *re* the sable and roan antelopes, demonstrate conclusively that at any rate the species nearest allied to the *leucophæus* are alert and watchful enough. No one could associate carelessness with the sable antelope, since, even when feeding, the old sentinel cows are ever ready at the slightest alarm to stand, suspicious and uneasy, with dilated nostrils and raised fore-foot, while even the chestnut-coloured calves prick their ears like their elders. Neither can one attribute heedlessness and stupidity to the inquisitive roan antelope, of which Sir Samuel Baker says, "in habits of watchfulness it is only equalled by the giraffe."

The best known haunt of the blaauwbok was the valley of Soete Melk (Sweet Milk), which Sir John Barrow described in 1801 as an extensive tract of land near the town of Swellendam, watered by the Zonder End River, and bounded to the north by a range of hills. The beauty of the district was much enhanced by a considerable amount of forest, and as the Dutch East India Company—the owners of the valley—reserved to

themselves the right of felling the trees for ship timber, we may assume that in maintaining this restriction the Company indirectly protected the blaauwbok by discouraging the visits of loafers; unfortunately the presence of even the Company's workmen would be by no means an unmixed blessing to the unfortunate antelopes, already almost exterminated. The local farmers were willing enough to shoot blaauwbok whenever a chance offered, as appears from Sir John's account; indeed, at first he supposed that the antelopes had gone under altogether—a surmise which happily proved unfounded at the time. Dr. Lichtenstein, the famous African traveller, and the founder of the Berlin Zoological Gardens, mentions the mountains near the Buffalo-jagt River, between Swellendam and Algoa Bay, as a haunt of these animals.

The history of the blaauwbok is brief enough, being little more than a record of senseless extermination. The first notice of it appears to be that of Kolben, who travelled in South Africa during 1700-1710. He called it the "Blue Goat," so that the characteristic appearance of the hide had evidently already been noted by the settlers. The first specimen seen in Europe was an example sent to Leyden, and carefully described by the Russian naturalist Pallas in 1766. A blaauwbok, shot by Col. Gordon, was also forwarded to Europe, and

was described by Dr. Allamand. In 1774 Thunberg gave the first indication of the approaching extermination of the species ; during seventy odd years the Cape Colony had made great progress, and the animal was already becoming rare. This cannot be wondered at, when we remember its limited habitat, situated comparatively near Cape Town ; perhaps the wonder is that it held out so long. By 1781 the Valley of Soete Melk, according to Le Vaillant, was the only place in which the blaauwbok lingered ; it had become the "most *scarce* and beautiful species of the African gazells." Some fifteen years later, Sir John Barrow concluded that the *leucophaeus* was "entirely lost to the Colony," but he learnt in 1796-7 that a small troop had appeared in the wooded hills behind the Valley of Soete Melk, and that the farmers, far from giving these survivors a last chance of restoring the race, lay in wait to shoot them. The candle had burnt down in the socket ; a last flicker of life is indicated by Lichtenstein who speaks of them as occasionally appearing near the Buffalo-jagt River, and relates that "some" were shot in 1800. These were the last of their race.

Thirty-five years passed ; the opening up of South Africa proceeded apace and the comforts of civilisation spread further and further into the wilderness. Explorers like Barrow, missionaries

like Campbell, and naturalists like Burchell, journeyed into the far interior. Travelling became easier and safer, while communication from place to place became more rapid. A great expedition sent out by the Cape of Good Hope Association for exploring Central Africa, passed into Bechuanaland, under the direction of that indefatigable worker, Sir Andrew Smith. Yet in spite of all this nothing was heard of the blaauwbok; not a solitary specimen, not a skull nor a footprint was found between Cape Town and the tropic of Capricorn. Sir Andrew even came to the conclusion that the *leucophea* could not be ranked as a true species, and that the classical specimen preserved at Paris was only an immature roan antelope. Sir W. Cornwallis Harris searched for the blaauwbok during his famous travels of 1836-7 with enthusiastic perseverance. "For a *leucophea*," he says, "I would willingly have given a finger of my right hand." No *leucophea* was forthcoming, however, and Harris began to doubt if it had ever existed; he came to the inevitable conclusion that by 1836, at any rate, it had been exterminated. "If the blue antelope *(Aigocerus leucophea)*[1] ever did exist it is now extinct." Other naturalists followed these distinguished

[1] *Aigocerus leucophea* was the scientific name then employed to denote the blaauwbok: *Hippotragus leucophæus* is its modern title, originally conferred on the species by its first describer, Pallas, and now resuscitated in accordance with the law of priority. In this essay *leucophea* and *leucophæus* are used as equivalent synonyms.

authorities, and it was finally declared that the few examples in museums were but dwarf or immature roan antelopes.

It was left for two Continental naturalists—Sundevall, of Stockholm, and Kohl, of Vienna—to demonstrate conclusively the right of the blaauwbok to rank as a true species. Sundevall, after an examination of a long series of roan antelopes, pointed out that the feet of the adult *leucophæus* preserved at Stockholm were *smaller* than those of quite immature examples of the roan ; and Herr Kohl, in his valuable paper, "Ueber neue und Seltene Antilopen," has drawn up a list of differences between the two. A careful examination of the Leyden blaauwbok—the very individual on which Pallas founded the species—will amply demonstrate that the *leucophæus* was clearly recognisable by the following characters :—

1. Horns relatively long and slender.
2. Ears elongated, but without a terminal pencil of hair.
3. Mane directed forwards.
4. Throat hairs not elongated.
5. No switch of elongated hair on the face.
6. No black on the face.

The above list of external characters may be compared with those of the roan antelope, whose shorter horns, great ears, upright mane, bearded throat, anteorbital brushes, and pied face abund-

antly proclaim it to be distinct from the blaauwbok. An examination of my photograph of the fine *leucophæus* now at Leyden will surely convince anyone that the blaauwbok cannot be identical with the roan. If an *immature* roan, why are the horns so well developed, in proportion to the size of the animal? If *adult*, though dwarfed, why is not the face marked with black, a pigment which begins to appear in mere calves?

The matter, however, is now settled beyond doubt. Several of the blaauwbok still in preservation have been found to agree in their measurements; and all the scientific world admits the *leucophea* as a true species, endorsing the dictum of Sundevall—"*Minime animat fictum ut credidit A. Smith, sed fere certe, at docuit Lichtenstein, in fine soeculi prioris extinctum.*"

A further argument—were one needed—may be adduced in favour of the blaauwbok as a distinct species. Its habitat is widely sundered from that of the roan antelope. The *leucophaeus*, always confined to the province of Swellendam, was finally lost in 1800; the roan antelope was not even discovered till December 1st, 1801, when Sir John Barrow's party met with it near Leetakoo (Kuruman), in Bechuanaland, under the name of the tack haitsie. Certainly Sir Andrew Smith mentions the roan as formerly occurring in northern Cape Colony, but it is not known to have been *common*

ROAN ANTELOPE CALF.

About 14 days old. Although very immature it already exhibits the characteristic black markings on the face, never seen even in adult blaauwbok.

in that region, and has never been recorded south of the Orange River; so that even accepting Sir Andrew's statement, many weary leagues would still intervene between the southernmost limit of the roan and the northernmost limit of the blaauwbok. If the two species were identical, surely fossilized or other remains would have been unearthed by this time in the intervening districts.

We may conclude this account of the blaauwbok by adding a census which enumerates all recorded specimens ; many of these unfortunately are not known to exist.

1. Pallas's type specimen, an adult bull, is still in the Leyden Museum, where I have repeatedly examined and photographed it. It is a fine specimen in excellent preservation, and probably carries the record horns. Measurements were taken by me in 1901 ; it is instructive to compare them with those of the female example at Vienna, by means of the following table :—

| | Blaauwbok Bull (Leyden). | Blaauwbok Cow (Vienna). |
|---|---|---|
| Length of horns along anterior curve | 24⅖in. | 20⅖in. |
| Circumference of horn at base | 6⅘in. | 5in. |
| Height at withers | 49⅗in. | 40⅘in. |
| Tip of muzzle to root of tail | 73⅕in. | 75⅕in. |
| Number of rings on each horn | 35 | 26 |

It will be noticed that the length of the male is less than that of the female ; Herr Kohl, however, does not state whether this measurement in the Vienna specimen was taken from the *muzzle* to

the root of the tail; this however being the usual custom, it is here assumed that such was the case, and the remarkable discrepancy on the wrong side may be explained by overstretching of the Vienna skin in mounting. Other measurements of the Leyden blaauwbok; minimum divergence of horns, $1\frac{1}{5}$in.; length of ear, $9\frac{3}{5}$in.; length of mane, $1\frac{1}{3}$in. Beyond the fact that it was shot previous to 1776, no particulars are known about the Leyden blaauwbok: it is a splendid example, well worthy to be the type of the species.

2. The blaauwbok shot by Col. Gordon and sent to Europe may have been the example which was acquired by Sylvius von Lennep, of Haarlem, and which at his death became the property of the Haarlem Société Hollandaise des Sciences. Be this as it may, Gordon's specimen was described by Dr. Allamand, and Gordon himself drew a beautiful figure of it: Buffon copied both Allamand's description and Gordon's figure for publication in his own Natural History. The spirited drawing of the blaauwbok published many years ago, as fig. 650 of the "Museum of Animated Nature," may have been taken from Gordon's sketch. Allamand incorrectly called the blaauwbok the tseiran, a name which rightly belongs to the Mongolian gazelle *(Gazella gutturosa)*.

3. A preserved skin of the blaauwbok was seen

by Dr. Sparrman near Krakeel River, about 1772.

4. Pennant bought a blaauwbok skin at Amsterdam previous to 1781. Each horn had twenty rings, and he tells us in his History of Quadrupeds, that the hair of this specimen was long, so that it was probably shot in winter coat. According to Pennant, the blaauwbok was mentioned at p. 58 of the Journal Historique (published at Amsterdam in 1778), under the name of Bouc-Chamois.

5. Le Vaillant's Hottentot attendant shot a blaauwbok bull, in the Valley of Soete Melk, in December, 1871. To judge from Le Vaillant's brief account, this example was in splendid adult condition. Like Harris long afterwards with the roan antelope, the French naturalist took a drawing of his prize on the spot; the Hottentot then skinned it, and the skin was carefully preserved by Le Vaillant, who was well aware of its value. This specimen is known to have been brought to Europe, but cannot now be traced.

6. Another male specimen was seen by Le Vaillant during 1781-85, and may have been the other example (or one of them, if there were several) which he brought home with the specimen of 1781, above mentioned.

7. Subsequently to 1782 a blaauwbok bull, obtained in the Valley of Soete Melk, was presented to the Governor of Capetown.

8. Le Vaillant also saw a blaauwbok bull at Amsterdam, where it had been preserved in excellent condition for fifteen years. He tells us that there was little if any variation between the different specimens he saw, thus unconsciously strengthening the claim of *H. leucophœus* to rank as a distinct species.

9. A blaauwbok is still preserved at Stockholm, and is the identical specimen which helped Sundevall to prove the essential distinctness of *H. leucophaeus*. It would be interesting to know if this example was brought home by either of the famous Swedish travellers—Thunberg and Sparrman[1] but information on this point will probably now be unobtainable.

10. The blaauwbok cow, on which Herr Kohl based his valuable paper, is still preserved at Vienna: this and the foregoing specimen are specially interesting, on account of the important deductions which have been drawn from them. Some of the measurements of the Vienna example have already been given.

11. A blaauwbok is still preserved at Upsala.

12. The blaauwbok bull still in the Museum of the Jardin des Plantes, at Paris, has given rise to a great deal of discussion. Supposed to have originally come from the collection of the Stadtholder of Holland, it was acquired by the Paris

[1] From the Krakeel River district?

Museum previous to 1840, and was believed by Harris (and probably by others also), to be the only specimen in existence. Sir Andrew Smith, when investigating the status of *H. leucophaeus*, received from M. Geoffrey a drawing of the Paris blaauwbok, and boldly declared that the treasured relic was only a young roan, differing from the ordinary form in lacking the chocolate red on face and breast. It does not appear that Sir Andrew saw the actual specimen; however, Dr. J. E. Gray, after examining the Paris animal, agreed with Smith, in spite of the eloquent arguments of Sundevall, who had also seen it. This was all the more remarkable, as Dr. Gray made himself quite a name for manufacturing new species. The fact that such expert authorities were unable to agree, naturally enhances the interest attaching to the specimen.

The Paris blaauwbok is a puzzle, and it is easy to understand how a naturalist like Smith, who had only seen a figure of it, might refuse to separate it from the roan antelope: at first sight it certainly does resemble a small, faded individual of that species. Besides, during its long *post mortem* career this historic specimen has been so banged about that it is impossible to determine whether its ears did or did not once possess pencils of hair: a most important point. A careful examination, however, soon demonstrates that it

is a true blaauwbok. The horns, *longer* and *more slender* than those of the roan, bear twenty-eight rings: there is no *black area* on the face, nor any *anteocular switch* of hair: the scanty mane is directed *forwards*. The specimen is much elongated, from faulty stuffing; and it has also been badly cut on one shoulder (perhaps from carelessness in skinning it): in spite of these blemishes, however, it has a remarkably fresh appearance, and certainly does not "look its age," for even the famous bluish-purple tint yet lingers on its century-old hide. The label bears the inscription:

"Hippotragus leucophaeus Pall:
Delgorgue. Afrique Australe."

13. In 1799 a *leucopheus* was shot and sent to Berlin. Dr. Lichtenstein described it in 1814, and it is fortunate that he did so, as it seems to have since been lost—perhaps destroyed by some person ignorant of its priceless value, like the dodo in the museum at Oxford. When the doctor wrote his account of this specimen (only a few years after it had been shot) the whole blaauwbok race had already disappeared from the face of the globe—"blotted from the book of life," as Harris expressed it long afterwards.

14, 15, 16? "Some" were shot in 1800, according to Lichtenstein, and their skins were sent to Leyden, but nothing more is known about them.

These blaauwbok of 1800 were the last of their race.

The above list comprises all the more recent occurrences of *H. leucophaeus*, and mentions all the stuffed examples now known to exist. There is a frontlet of a bull blaauwbok in the Natural History Museum : each horn is twenty inches long, and bears twenty rings. No data concerning it are known, though it has long been in the National Collection. It is interesting to remember, however, that this frontlet may have once belonged to one of two famous naturalists. The horns attached to the skin bought at Amsterdam by Pennant, were twenty inches long and had twenty rings on them : could the fate of Pennant's specimen be traced, its horns might be found to be identical with those on the frontlet above mentioned. Again, Sir Hans Sloane's collection, purchased in 1753, on the foundation of the British Museum, contained several natural history specimens from South Africa (such as a horn of the white rhinoceros), and may well have included relics of the blaauwbok—at that time a comparatively *abundant* antelope. Finally, there is still in existence a most interesting relic of *H. leucophaeus*, which seems to have been strangely overlooked by naturalists.

It has hitherto been supposed that the blaauwbok is represented to-day only by stuffed specimens

and by the frontlet above referred to: no skull being known to exist in any museum, nor does there seem to be any description of one in the whole of scientific literature, the acquisition of such a desideratum being apparently considered about as likely as that of the living animal itself! Nevertheless, a blaauwbok skull—unfortunately imperfect—has for many years been preserved in the Royal College of Surgeons' Museum in Lincoln's Inn Fields. A careful comparison of this skull, with that of a roan antelope, has convinced me that it is genuine. The horns, like those in the Natural History Museum, bear twenty annulations, and are relatively long and slender. They appear to be less curved, however, than those in the National Collection: and since the skull is comparatively smooth with little development on bony ridges for the attachment of muscles, it seems probable that the animal was a female. There can be no question of the *maturity* of the animal, for between the lowest ring and the true base of the horn there is a considerable portion (about one-sixth of the total length) without rings, but ornamented with a great number of indefinite wavy furrows: had the horns been still growing, the annulations would have continued right down to the base. The skull, therefore, cannot be that of an immature roan, the only other species with which it could

THE UNIQUE BLAAUWBOK SKULL:
In the Royal College of Surgeons' Museum.

possibly be confounded. Apparently, the animal was shot in the prime of life: the horns are neither worn nor splintered: the sutures of the skull are unobliterated, and the teeth are in excellent condition. Unfortunately the premaxillae and lower jaw have been lost.

The following horn measurements of this unique example may be compared with those of horns attached to skin-specimens at Leyden, Paris, &c.:

Length of left horn[1] over anterior curve, 22in.

Circumference at base, 6in.

Minimum divergence, 1½in.

No. of rings: 20 (left horn), 21 (right horn).

To recapitulate:

The horns attached to the male frontlet in the National Collection are 20 inches long: those of the bull at Paris, tape 21½ inches: of the bull at Leyden—a record measurement—24⅖ inches. The horns of the cow at Vienna reach 20⅖ inches, and those of the cow in the Royal College of Surgeons' Museum are 22 and 21 inches respectively. Thus the various measurements show a certain relationship to each other: had the specimens from which they have been taken belonged merely to a haphazard series of *different* animals instead of to one definite species, they would not have exhibited this agreement. The dimensions

[1] The right horn has about one inch of the tip missing, hence the original distance between the tips could not be taken.

of the horns, coinciding as they do within limits, constitute the final link in our chain of facts : for unlike the dimensions of the skin, they cannot be distorted and overstretched in stuffing, and must always remain unaltered. Enough has now been said to prove to the hilt the right of the blaauwbok to rank as a distinct form.

*Quod erat demonstrandum.*

ROAN ANTELOPE (Senegambian race).
Showing protective assimilation to surroundings.

# THE ROAN ANTELOPE

The study of the variation of species under domestication has long afforded instruction, not only to the evolutionist and the scientific naturalist, but also to the practical breeder of animals. The numerous and widely-differing types of dog and horse, sheep and pig, cat and rabbit, exhibit a marvellous plasticity of constitution under the artificial influence of selective breeding. For instance, few greater contrasts could be found in external appearance than are seen in the outlines of the long-legged, snipe-jawed greyhound, and the sturdy bulldog ; in the heavy-footed Clydesdale and the slim racehorse ; or in the Manx tabby and the long-haired Persian cat. These are only a few instances amongst many illustrating the facility with which the characters of domesticated animals may be modified by the action of man.

The variation of species in the *wild* state, uninfluenced by human agency, is also a theme of fascinating interest, and almost equally intricate : the bewildered worker in every department of zoology is as far off as ever from drawing the line between a true species and a mere variety, some naturalists assigning specific rank to forms to which others would only allot varietal

importance, and *vice versa*. Thus we have the perplexing variations amongst the *Felidae*, as instanced by the serval and the servaline cats, or by the ocelot of America, with its fulvous, grey, and pallid phases: the puzzling and unsolved relationship between the European brown bear (*Ursus arctos*), the barren ground bear (*U. richardsoni*), and the grizzly (*U. horribilis*): whilst the protean variations of the Burchell zebra (*E. burchellii*) are now ranked as sub-species under the names of *E. burchellii chapmanii*, *granti*, *selousi*, and so on. It will thus be seen that not only are wild animals liable to considerable variation, but also that the study of this phenomenon alone would occupy a lifetime.

The splendid roan antelope (*Hippotragus equinus*) of Africa is a very unstable species, and serves as an excellent example of animal variation. It is distributed over a large portion of the African continent, from the White Nile as far south as and including the Transvaal; while in former times it was also found in Cape Colony, north of the Orange River. It occurs in West Africa, but is absent from the Congo forest region. With the single exception of the eland, the roan is the largest of all the magnificent antelopes of Africa, and stands about 56 inches high at the shoulder, its splendid proportions being enhanced by its stately bearing and self-possessed carriage. The

horns, though comparatively small for so sturdy a beast, are very stout, heavily annulated with from twenty to thirty rings, and curve backwards to end in sharp points. A curious brush of long white hair, springing from just beneath the eye, passes downwards and outwards across the face : the ears are enormous and curved at the tips, which droop markedly, and are frequently ornamented with a pencil of black hair. The flat, muscular neck of the roan antelope is surmounted by a thick, upstanding mane, which extends from occiput to withers : the throat is heavily ruffed. The body is stout and markedly equine in contour, the legs are slender and clean, and the tail is short, barely reaching the hocks.

The coloration of this antelope is extremely variable. All forms have the muzzle white and the cheeks black, with a white patch about the eyes in addition to the white brush of hair already alluded to : the abdomen is also whitish, and the anterior surface of the legs blackish brown. The general body colour, however, varies a good deal, and naturalists are by no means agreed as to the number of species or subspecies now grouped together under the name of roan antelope. The typical form from the Cape is very inconstant in colour, ranging in hue from a dark brown to a strawberry roan, which in some individuals becomes almost white : a good example of the brown phase

is now mounted in the Dover Museum, while the rufous form is represented in the Natural History Museum at South Kensington; and a whitish specimen, shot in 1836 by Sir W. Cornwallis Harris, is figured on plate xviii. of that naturalist's famous work on the South African Game animals. The little known roan of East Africa is pale reddish on the body, with dark, reddish legs, and some naturalists have thought it worth while to give it the names of *Hippotragus equinus rufo-pallidus* and of *Hippotragus langheldi*: probably this distinction will be abandoned when it has become better known to museum experts. In West Africa we see a greater development of the reddish colouring, the Senegambian roan being warm, rufous-grey or chestnut, while the northern-most form (Baker's roan antelope) is mouse-coloured. In all forms the body colouring merges gradually into the white of the abdomen, in remarkable distinction to the closely allied sable antelope (*Hippotragus niger*), which is arrayed in a handsomely *contrasted* livery of jet black and snowy white.

Passing now to the history of the roan antelope, we find that it was first seen by Europeans on December 21st, 1801, the individuals concerned being the members of Sir John Barrow's party, who had travelled into Bechuanaland for the unromantic purpose of buying cattle. No specimen

was secured, but a fairly accurate and quite recognisable description of the animal has been left by Truter, who says: "the animal appeared to be near five feet high, the colour a cinerous blue, and shape not unlike the nilghau of India, the *Antilope picta.* Its mane is black, long and flowing over each shoulder: its beard is long and pointed: the tail short and naked: the horns from fifteen to eighteen inches long, pointing backwards, and bent into a circular curve, embracing about a fifth of the whole circumference, annulated from the root to about two-thirds the length." The natives near Leetakoo (Kuruman), where Barrow's party saw the animal, called it the Tackhaitsie, and stated it to be very fierce and dangerous.

Daniell's volume of sketches, containing a figure of the Tackhaitsie, is still extant, though rare. Unfortunately the animal has been represented as of a very uncompromising blue-grey colour: the mane is not only wrongly figured as drooping instead of erect, but is further shewn as pendent on *both* sides of the neck: the "beard" is shown as long and pointed, and strictly confined to the chin! Daniell's figure well illustrates the difficulty of accurately representing a new species without first securing a specimen: had the party succeeded in shooting a tackhaitsie instead of staring at it, such a ridiculous figure would never have been published. It is to be feared that Daniell hindered rather than

helped science by his unfortunate effort: certainly for years afterwards naturalists did not recognise that the roan antelope was the true tackhaitsie of Barrow.

The first specimen of the roan antelope to reach the museums of *Europe* appears to have been the example received at Paris from an unknown locality, and described by Desmarest in 1804 as the "antilope osanne." The first specimen brought to *England* was the rufous-gray animal, shot in December, 1812, at the "little Klibbolikhonni fountain in the Transgariepine," and presented to the British Museum by Dr. Burchell: it was figured by Landseer in "Griffith's Animal Kingdom," and the horns are still in the National Collection.

Burchell searched in vain for the "tackhaitsie" as represented by Daniell: and Sir Andrew Smith in 1836 took up the quest with the same result. He even provided himself with a copy of Daniell's figure, which he showed to the natives: but though many of them had grown old in the very region it was said to inhabit, none of them recognised the animal, nor will anyone who compares Daniell's figure with an accurate drawing of *H. equinus* wonder at it. Sir Andrew finally recognised that the tackheitsie and the roan antelope were one and the same animal; and in his account of the roan, in his "Illustrations of South African Zoology," expressly states that it is

the "tackhaitsie of the Bechuanas": the species is correctly figured on plate xxvii. of the above-mentioned work. The example from which the figure was taken (a young bull) is still in the National Collection. In spite of its great *post mortem* age, the animal is in good preservation: and it is most interesting to stand and contemplate this historic specimen, presented to the British Museum by the very man who established the identity of the tackhaitsie with the roan antelope, and constituting a link between the present day and the Africa of the long-vanished past, when all the rivers of the interior were alive with bellowing hippotami, when the lion infested every fountain, and the spreading veldt teemed with countless hartebeest and wildebeest, buffalo and rhinoceros, elephant and giraffe. "Not very many years ago," said Sir Andrew in 1840, "the animal was frequently seen within the northern boundary of the Cape Colony," and although the roan has long disappeared from that region, it still lingers in the Transvaal. A considerable amount of information as regards its habits was collected by Smith's friend Harris, and has been supplemented by later writers.

The roan antelope is stated to congregate in small troops, composed of from five to a dozen individuals, and usually including only one adult bull: as with many other antelopes, solitary old

males are often seen. Wounded individuals are apt to turn on the hunter, if pressed too closely, when from their great size and strength they are most dangerous antagonists, striking right and left with their formidable horns; the blows are delivered with a tremendous violence that makes utter havoc of a pack of strong dogs, and will mortally wound a horse. Like other antelopes, the roan is fond of rubbing and grinding its horns against trees and stumps; it retains this habit even in captivity. Roan calves are of a light chestnut colour: an example shot by Mr. Selous will be found figured on an adjoining page.

In addition to the mystery long attaching to it as the dreaded tackhaitsie of the Bechuanas, the roan antelope is apparently one of the numerous animals which have masqueraded as the unicorn. The original of this fabulous creature has been variously identified as the rhinoceros, the gemsbok, and the beisa—the last-named being a long-horned antelope, closely allied to the gemsbok, but inhabiting north-east instead of southern Africa. To this interesting trio there seems good reason to add a fourth—the roan antelope, as will be seen from the following account.

Sir John Barrow, during his travels in South Africa, at the close of the eighteenth century, heard reports of the existence of a strange one-horned animal, which was said to inhabit the

regions immediately north of the Tarka mountains, near the Bambosberg, in Cape Colony : Col. Gordon, himself an eminent naturalist, had already seen several native drawings of the mysterious creature, and thoroughly believed in its existence. Inspired with the hope of obtaining so marvellous a trophy, Sir John himself made a diligent search in the locality which the unicorn was supposed to inhabit : and achieved the partial success of discovering a rude drawing of the animal, sketched by a Caffre on the wall of a deep cavern. The unicorn was represented, together with a number of other African animals, but unfortunately the body and legs had been erased to give place to the figure of an elephant : the mutilated drawing was however copied, and is reproduced in Sir John's "Travels in Africa," Vol. I., p. 311. The animal's head is figured as possessing long ears, and set on a stout neck, exactly like the roan antelope ; the single horn is annulated at the base and curved in its upper two-thirds (also like *H. equinus*) ; a backwardly-directed mane adorns the neck. It is true that the animal of the Tarka cavern is shown with but one horn, and that growing out of the forehead at an angle of 45° : but even a two-horned animal like the roan, when seen sideways, might seem to have only one, especially at the respectful distance the natives would take care to maintain between themselves and it : many

antelopes, however, in fighting amongst themselves snap off one horn, and thus become true unicorns. Moreover, although the horn is represented as growing from the unicorn's head at an angle, this may only have been the native artist's method of representing a typical pose of the animal, and here again we observe a likeness to the roan, for the hippotragine antelopes in fighting draw in the head and lower the horns so that they project forwards. The Tarka unicorn and the roan antelope are probably one and the same animal: and it is surprising that when Sir John discovered the "tackhaitsie" a year or so later, he did not recognise in it the long-sought monoceros of the Caffres.[1]

The mysterious unicorn died hard. Many years after Sir John Barrow's party had safely returned to Capetown, Sir Andrew Smith heard reports of a one-horned animal said to exist somewhere north of the Tropic of Capricorn, and which was said to be very different from any known species of rhinoceros: he also published some remarks communicated to him by the Rev. Mr. Freeman on an extraordinary animal reported in his day to be fairly common in Makooa, where it was known as the Nzoodzoo. The naturalist will see on

[1] It appears that the Bushmen near Leetakoo (Kuruman)—the very place where Barrow discovered the "tackhaitsie"—were in the habit of adorning the walls of caverns with drawings of animals, including *unicorns*. Gordon Cumming mentions such an improvised art-gallery, situated to the west of the waggon-track between Kuruman and Daniels'-Kuil.

THE "TACKHEITSE."

The first living example in England of the southern roan antelope: the tackheitse of Sir John Barrow and probably the original of the Tarka unicorn.

comparing the account of the nzoodzoo with the roan antelope, that, with the exception of the horn being single in the former animal, the descriptions of the two are suspiciously alike. The length of the horn of the supposed unicorn was said to be from two to two and a half feet long: the weapons of the roan antelope vary from 24 to 36 inches in length. The horn of the nzoodzoo was said to be capable of being curled up like the trunk of an elephant at the will of the animal: we recollect that the horns of the roan are curved in scimitar-fashion. The unknown animal had the size and strength of a horse, and was extremely fleet: the roan has curiously enough received the apt name of *Hippotragus equinus*, on account of its horse-like outline, and modern sportsmen have found it to run for miles when pursued.[1] The female nzoodzoo was said to be absolutely hornless: strange to say, the female roan was long thought to be unhorned, even so good an authority as Harris, who had himself hunted the animal, stating in 1840 that the female *H. equinus* had no horns. The ndzoodzoo was very fierce, attacking men on sight: the Bechuanas in Barrow's time were afraid of the fierce tackhaitsie ("the wicked one") and even white hunters have found the roan antelope dangerous enough at close quarters. These

[1] Mr. E. N. Buxton says of the roan antelope, "When galloping, their long tails and manes give them almost the appearance of wild horses." Two African Trips, p. 72.

statements concerning the ndzoodzoo being so wonderfully paralleled by our knowledge of similar facts concerning the roan antelope, surely remove the matter out of the domain of mere coincidence: and assuming that the two horns of the antelope had in the distance appeared as one (the animal having been seen sideways), we are driven to the conclusion that the ndzoodzoo of Makooa is identical with the roan antelope. The finishing touch to the matter is given when we remember that Makooa is the country between Lake Nyasa and the Mozambique Coast—a well-known haunt of the roan antelope.

The East African roan differs but little from the southern form, and may be dismissed without further notice. The West African phase of *Hippotragus equinus* is the handsomest subspecies of all, as will be seen from the following description of a fine female of this variety which was living in the Antwerp Zoological gardens in 1900: "Face black, with a small greyish area above the muzzle: anteocular stripe white, postocular pale brownish-white. Iris black-brown. Ears chestnut externally, and thickly lined internally with long fine dirty-white hairs. General body colour splendid warm rufous paling into white on abdomen and buttocks. Mane, tail and anterior surface of legs blackish-brown." This variety is now known as *Hippotragus equinus gambianus* in

allusion to its habitat: besides its brighter colouring the West African roan has the ears even longer than in the typical South African form. The western subspecies was first known from two or three living specimens brought home by Whitfield on the SS. "African" in 1848; these were all young animals intended for the splendid menagerie which the thirteenth Earl of Derby was then maintaining at Knowsley Hall near Liverpool. One of the antelopes died in London on its way to Knowsley and was mounted for the Derby Museum. On the death of Lord Derby in 1851 his splendid collection of preserved specimens, including the roan antelope, became the property of the city of Liverpool, and is now housed in the Liverpool Museum. The Liverpool specimen, although immature, agrees with the Senegambian adult cow at Antwerp, both in its coloration and in its immense ears: the horns are only about three inches long and are very slightly curved at the extreme tips.

Travellers have assured us that the larger antelopes in spite of their size are not of necessity conspicuous when seen amongst their natural surroundings: and further, that even waterbuck, roan, or sable antelope may be effectually concealed when standing amongst the shadows of thick bush. I recently had an opportunity of verifying this, though the animal con-

cerned was the brilliantly coloured Senegambian roan and its surroundings were the artificial adjuncts of the Antwerp Zoological gardens. During 1900 the West African roan before mentioned was turned out like the rest of the animals to graze in its paddock: in spite of its great size and rufous coat it was quite inconspicuous when standing under the trees, the black of the face and legs merging insensibly into the shadows cast by the overhanging boughs, whilst the blazing sunlight streaming through the interstices of the foliage merely revealed the sleek body of the antelope as a large surface of uniform coloration. These points may be readily observed by examining the photograph of the individual taken at the time: probably in its natural state the animal would have been still better concealed.

The northern form of the roan antelope—Baker's antelope of some naturalists—(abou aroof of the Arabs) has by some been regarded as a separate species under the name of *Hippotragus bakeri*. Very little is known of it, however, and Sir Samuel Baker, who discovered it in 1861 on the confines of Abyssinia, did not himself obtain a good specimen, but only the battered remnant of an individual which had been killed by a lion. A few living *bakeri* have been brought alive to Europe. There was a young bull of this form in the Royal menagerie at Turin in 1867, a second

example at Berlin about 1879, and a third (also at Berlin) in 1899: while the young roan from Upper Nubia received by the Zoological Society of London in 1878 probably also belonged to Baker's subspecies. I remember noticing in 1901 the name of *Hippotragus bakeri* in a list of animals offered for sale by Herr Menges, the well known wild beast merchant, but do not know what became of the specimen thus advertised. A good bull of this subspecies, shot at Gondokoro on the Upper Nile, is now in the National Collection.

In captivity the roan antelope does fairly well, though like all the larger antelopes it is a dangerous pet. Those kept at Antwerp were evidently conscious of their strength, continually grinding their massive horns against the strong railings of their pen, and exhibiting a restless and half-savage demeanour. The roan will become half-tame, feeding from the hand and even allowing an attendant to enter the paddock provided he keep a respectful distance: it would, however, go hard indeed with any person rash enough to approach too closely to these, perhaps the most dangerous of all the African *Bovidae*. Those who have been accustomed to consider antelopes as gentle, pretty creatures ready to flee timidly on the slightest alarm would speedily be undeceived on attempting to play with either roan, sable or hartebeest, even

though the same animal had fed from the hand a few minutes before: the experimenter would be soon carried to the hospital there to reflect on his folly at leisure.

There seems to be no record of these animals ever having bred in captivity: but turned out in semi-freedom in large paddocks there seems no reason why acclimatized individuals should not do so. The closely allied sable antelope bred in the Hamburg Zoological Gardens in 1894, and at Cologne in 1896 and 1898: the eland, the sing-sing waterbuck, the blue wildebeest, and the black wildebeest have all reproduced their kind in confinement, so that European skies are by no means inimical to the welfare of African antelope life. A herd of roan with their great stature and imposing presence would make a magnificent if dangerous ornament to a gentleman's park: the animal seems, however, to be but little known save to experts, and the first living example of the southern or typical roan (the true tackheitse) seen in England did not reach this country till November 28, 1902, when a fine young cow presented by Major Minchin, D.S.O., arrived at the Zoo. The more stringent enforcement of game preservation in Africa, and the increasing interest taken in natural history in Europe make it possible that in the future this noble beast may become better known. Certainly when one reflects on

the atmosphere of mystery which for long years shrouded its very existence, together with the interest which attaches to it for its own sake, it will be admitted that few of the splendid animals of Africa can rival *Hippotragus equinus* in interest: while the beast itself occurs in so many phases—brown, grey or reddish in the south, rufous on the West Coast, and mouse colour on the Upper Nile—that one may well apply to it (after alteration) the famous words of the Roman poet:

> "Varium et mutabile semper
> *Equina.*"

## THE MHORR GAZELLE.

One of the most remarkable features which has characterised the advance of modern therapeutics (the application of drugs in disease) has been the gradual abandonment of substances derived from the animal kingdom, whilst remedies obtained from plants—digitalis and strophanthus, strychnine and belladonna, lobelia and colchicum—are daily employed throughout the globe. The animal world is now hardly represented by any internal medicaments at all, unless one include the various antitoxic serums used in combating diphtheria, plague, and tetanus: these, however, are not taken by the mouth, but are introduced under the skin.

In ancient times, however, matters were far different, many animal substances being long employed, though now discarded as useless. Castoreum, hyraceum, ambergris, and many other drugs now abandoned were once in high favour: and marvellous cures have been reported after the use of agents which were (to say the least of it) extraordinary; whether the cures resulted on the *post hoc* or *propter hoc* principle is a matter for very free speculation. Rondeletius recounts how a tench applied to the feet of a sick man caused a marvellous recovery: the sudden application of

MHORR GAZELLE (in the Antwerp Zoological Gardens).

such a cold, slimy object to the feet of a man in a burning ague would, it must be admitted, conduce to speedy animation, combined with vivacity of thought and freedom of language on the part of the sufferer, even if no permanent result were obtained. Dr. Caius also recommended this fish, saying that tench were "good plaisters, but bad nourishment, for being laid to the soles of the feet, they often draw away the ague."

Amongst other strange *materia medica*, we may note that the web of a spider was a reputed remedy against fever, and its body, or eggs, would disperse white specks in the eye : a living toad laid on the most deep-rooted cancer would infallibly cure it : whilst poison poured into the inverted horn of a rhinoceros was at once detected by the frothing bubbles which rose from the depths of so magical a cup. In many cases the implicit faith maintained in these remedies almost amounted to superstition : high prices were paid for substances utterly worthless for the purpose for which they were purchased, and popular credulity appears to have known no bounds. Prominent amongst these pseudo-remedies and once as highly-prized as any of them in mediæval medicine, rank the curious objects known as bezoar stones. These bezoars were formerly worn round the neck as amulets, and valued as antidotes to poison and fevers : the Chinese used them both as a pigment and as a drug. It is

recorded that formerly a bezoar was valued at ten times its weight in gold, and that a stone weighing four ounces could formerly be sold for upwards of £200. So deeply rooted and so widespread was the old-time belief in their efficiency that the whole subject of bezoars is a highly interesting and romantic subject, well worthy of the days when men believed in the existence of the philosopher's stone, when they thought that the earth was flat, and that all Africa beyond the Atlas mountains was alive with dragons and dog-headed men.

Examined by the critical light of modern science, bezoars are demonstrated to be concretions or calculi occurring in the intestines of various ruminant animals, such as the Persian wild goat *(Capra ægagrus)* and the mhorr gazelle of Southern Morocco: indeed, every individual of this gazelle is said by the Moors to contain two bezoars. These concretions are either oval or orbicular in shape, and consist of odourless tasteless organic matter, more or less greenish in colour. They are smooth externally, and their size varies from that of an acorn to that of a pigeon's egg. When broken, bezoars exhibit a waxy fracture and are seen to consist of concentric layers of material disposed about a small nucleus, such as a bit of stone or the bud of a plant: when burnt they are almost entirely consumed and leave but little ash. These stones exhale an aromatic

odour like the ambergris found in the intestines of the cachalot whale, a substance to which, by the way, they are strictly comparable. They contain a large amount of organic acids (ellagic acid in some bezoars, lithofellic in others), but although nine varieties are known, not one appears to have any claim whatever to the medicinal qualities once assigned to them.

Formerly used to combat vertigo, palpitation of the heart, colic and jaundice, they were probably utterly useless in any of these capacities: if they possessed any properties at all they were at most mechanically absorbent, and of no more efficacy than so much chalk. Some authorities derive the name bezoar from the Persian pād-zahr or expeller of poison: it has, however, been suggested by Mr. Drummond-Hay that since the Moors call the bezoars obtained from the mhorr gazelle Baid al Mhorr or "eggs of the Mhorr," the word may have been derived from the Moorish rather than from the Persian language.

The Mhorr Gazelle *(Gazella mhorr)* as one of the chief sources of the famous bezoar stones, deserves the attention not only of every naturalist, but of every chemist, of every physician, and of every antiquarian. Standing about thirty-five inches high at the withers, this splendid gazelle is of a rich rufous fawn colour on the body, paling in intensity towards the hind quarters: the abdomen

and rump are white. The face, forehead and chin are whitish fawn: the cheeks are of the same ground colour but are ornamented with a blackish streak, whilst a dark-coloured area also occurs below the horns. This gazelle has a conspicuous white mark on the throat: its legs are rufous externally, and white internally, the rufous of the hind legs *being continuous* with that of the body. Young mhorr have the horns appearing as short spikes, strongly and uniformly curved forwards:[1] with increasing age the horns gradually assume the adult shape, and become thick, annulated at the base and bent strongly backwards, being finally directed forwards and upwards to end in sharp points. The horns of an example measured by Mr. Bennett taped twelve inches along the anterior curve, and the tips were four inches apart. The knees of the mhorr gazelle bear small brushes of hair.

The unsettled nature of the country inhabited by this antelope has not conduced to original observations on its habits, and practically nothing whatever is known about it in the wild state, although the animal has long been known to science. Occasionally one or two living examples are sent to Europe: but the species remains

1 This is well seen in the two young mhorr (labelled as *Gazella dama*) now in the Jardin des Plantes Museum. The head of each animal bears two forwardly directed spikes, being about 3½ inches long in one animal and 1½ inches in the other. These specimens came from Senegal, and were acquired from M. Fronsacq.

exceedingly rare not only in zoological gardens but even in museums, where skins and heads of animals can be so readily stored that even rare forms may at last become well represented by the gradual accumulation of chance specimens. The relationship of the mhorr to other gazelles is a very interesting theme which although it has received considerable attention from naturalists is not yet fully elucidated. Three large forms of gazelle exist in North and West Africa, all evidently closely connected, and in their long necks and legs showing considerable affinity with the curious gazelle-like antelopes (gerenuk and dibatag) which inhabit Somaliland. The three forms are (1) the mhorr gazelle already described: (2) the dama gazelle inhabiting Senegal and Gambia: and (3) the red-necked or addra gazelle of Dongola and Sennaar. These three animals may eventually be found to be more akin than is at present admitted by naturalists: a few words may here be devoted to this matter.

The dama (*Gazella dama*) is a fine species so closely resembling the mhorr as to be practically identical with it. The only remarkable difference between the two is that in the dama the white of the abdomen and rump coalesce to separate the rufous hue of the hind legs from that of the body. Some naturalists have indeed united the two forms. The splendid menagerie which Lord

Derby established at Knowsley Hall from 1835 to 1851 contained several dama which had been brought home by the collector Whitfield, and in 1865 a pair were sent to London from the Antwerp Zoological Gardens. In spite, however, of the casual acquisition of a few specimens, the dama is as rare as the mhorr in menageries and museums, and even less if possible seems to be known about it.

The red-necked gazelle (*G. ruficollis*) is a very pale form, being nearly all white save for the rufous of the neck and anterior back; the median line of the face is also tinged with rufous. It however resembles its congeners not only in its size and general proportions, but also in the presence of brushes on the knees, while there is also a white spot on the throat. It therefore appears probable that as Africa becomes better known, intermediate forms will be obtained connecting this gazelle with the mhorr; indeed, even in the present state of our knowledge, we see a very great likeness between the two antelopes.[1] Although the resemblance between the red-necked gazelle and the mhorr is by no means so striking as that between the latter animal and the dama, nevertheless it will be admitted that all three gazelles approximate not only in form and size, but

1 Judging from a photograph published in *Animal Life* for May, 1904, the male red-necked or addra gazelle in the Khartoum Zoological Gardens is almost indistinguishable from *G. mhorr*.

even in coloration, since all three animals have the neck rufous, with a white spot on the throat, and all are more deeply coloured anteriorly than behind. The mhorr would appear to be exactly intermediate as regards coloration. On one hand stands the richly-marked dama, in which the white areas have their fullest development, as marked by the junction of the white of abdomen and rump: on the other is the pallid *G. ruficollis*, whose coat in typical specimens hardly shows any contrast at all, save on the neck and back, the rest of its pelage being dominated almost entirely by white. It is a significant fact that the mhorr is also intermediate in geographical range, as if the ancestors of these gazelles, in migrating westwards, had gradually assumed a darker coat, in lieu of their original pale one,[1] thus affording an illustration of the fact that many widely-distributed forms assume a more or less rufous colour in West Africa.

The mhorr gazelle was first brought alive to England in 1833, when a pair, captured near Wed Noon or Oued Noon, was presented to the Zoological Gardens by Mr. E. W. A. Drummond Hay: the male of this pair is now in the National collection. Although these specimens were care-

[1] On the other hand, the red-necked gazelle may have lost its former deep colouring: several desert-haunting animals, such as the addax antelope, are protected by their pale coats, which harmonise with the shimmering glare of the sand.

fully dissected after death, no bezoars were found in the intestines of either. A young pair of this gazelle was sent to the Jardin des Plantes at Paris about the same time as the others arrived in England, and lived in the gardens of the French capital for a considerable period. A photo-engraving was published several years ago representing a mhorr then living in the London Zoological Gardens. This specimen was tame enough to allow the keeper to approach within a yard of it, and is shown standing close to him in the photograph.

In 1900 a fine mhorr gazelle was living in the Antwerp Zoological Gardens. *G. mhorr* and *G. dama* had here evidently been considered as the same species, since, although the rufous of the legs was continuous with that of the body, the name of the latter animal appeared on the label attached to the cage. This individual was in excellent condition, and exceedingly tame, constantly coming up to the railings to be noticed by strangers, and ever ready to accept food from their hands. Owing to the insufficient light (it was raining outside), it was impossible to take a snapshot, and a time exposure was attempted: photographers who know the difficulty of doing this with a living animal as a subject will appreciate the hindrance caused by the confident overtameness of this mercurial

MHORR GAZELLE (showing shape of horns).

antelope, which was almost continually moving some portion of its body, and hardly kept still for ten seconds together. Half a dozen films were exposed, with but indifferent results : however, knowing the extreme rarity of the animal, the writer persevered. The best of several efforts is reproduced at the head of this essay : it demonstrates the markings of the rump and hind legs characteristic of the species, and will, it is hoped, constitute a useful contribution to the existing material—all too scanty—available for the study of this antelope.

There remain, even to-day, many interesting mammals, with whose habits and affinities the naturalist is but very imperfectly familiar, and he will find abundant scope for his energies in duly prosecuting his studies amongst the same. Africa especially abounds in little-known animals—the white-winged bat of the Gambia, the jumping shrews, the potamogale, the Western linsang, the okapi : yet on account of its little understood relationships with other antelopes, and on account of its rarity and beauty, few members of the splendid African fauna exceed in interest or in attractiveness the subject of our essay—the mhorr gazelle.

## THE BLUE WILDEBEEST.

The occurrence of curious parallel resemblances between creatures of far-sundered genera is comparatively frequent throughout the animal kingdom. Numerous instances of this are readily called to mind, the various organs of the species concerned being adapted to the environment of the animal on similar lines, although the creatures themselves may have no real affinity with each other. Taking the mammalia only, the mimicry of a squirrel by the tupaia or tree shrew, with rodent-like attitudes and bushy tail complete, is a remarkable example only equalled by the curious reverse mimicry of the tupaia itself by the Bornean tupaia-like squirrel with its elongated muzzle and shoulder-streaks. The insectivorous mole of Europe finds its zoological parallel in the mole-rat of North Africa, and in the marsupial mole of Australia : the parachute of the cobego reappears as the volant membrane of the anomalurus, the patagium of the flying squirrel and the extensile skin-fold of the flying phalanger. The spines of the hedgehog and of the tenrec may be contrasted with the formidable quills of the porcupine and with the serried panoply of the echidna, while the rodent jerboas and the kangaroo

BLUE WILDEBEEST BULL.

Note the apparent compound of buffalo, antelope, and pony. The head is decorated with shaggy bunches of hair and the neck is curiously brindled with a number of vertical lines.

rats are copied more remotely by the marsupial jerboa-mouse and by the rat kangaroos.

There exists also a still more remarkable class of resemblances, being almost a caricature of the first; for in the second series the likenesses are more or less grotesque, and instead of sustaining a semblance of any one animal, appear rather to form a bizarre combination of several. Thus the eupleres of Madagascar, with its minute teeth, snipy jaws, and bushy tail, is an aberrant civet showing insectivorous characters: the saiga with its semi-translucent horns, its tapir-like proboscis, and its ovine coat shed annually in patches is hardly recognisable as an antelope: the aard vark combines the snout of a pig and the tongue of an anteater with the ears of a rabbit and the burrowing claws of an armadillo, whilst the ornithorhynchus of Australia, duck-billed and web-footed, with the fur of a mole and the spurs of a fighting-cock—being hatched to begin with from a leathery egg like that of a tortoise—is almost mammal, bird, and reptile all in one.

Perhaps the most singular of these nondescript forms is the blue wildebeest, or brindled gnu (*Connochaetes taurinus*), of South and East Africa —blaauw wildebeeste of the Boers—kokoon of the Bechuanas—imbutuma of the Kaffirs—a large antelope standing over four feet high at the

withers and bearing much superficial resemblance to a buffalo. The head, neck, and shoulders of the blue wildebeest are very heavy-looking, in remarkable contrast to the neat antelope legs and the long sweeping tail, which resembles that of a horse. The horns are stout with broad palms, and first passing outwards from their base curve upwards, forwards, and inwards to end in sharp points. The face is much elongated and a shaggy brush of coarse hair hangs over the forehead and nasal region. The muzzle is broad and flat. The neck of the blue wildebeest bears a thick mane partially upright, but inclining to one side in its posterior third—a fact which appears hitherto to have escaped the notice of naturalists. The throat is adorned with several bunches of thick hair. The general colour of this savage-looking creature is bluish-grey, inclining to fuscous on the legs; the mane, together with the bunches of hair on the face and throat, is black. The neck and forequarters are brindled with about seventeen lines of differently directed hair which, as the set of the fur is opposed to that of the coat, generally appear to be bluish-black in colour. A number of black particles dotted along the spine form a very indistinct dorsal line. These antelopes show considerable tendency to sport white hairs about the nostrils and muzzle, and a blue wildebeest with a white tail has been recorded, although

this member is normally black in *Connochaetes taurinus.*

The present species ranges throughout the eastern portion of the African continent, from the Vaal River as far north as Kilimanjaro, and like the roan antelope, the Burchell zebra, and other widely-distributed animals, shows considerable tendency to variation in the different portions of its extensive habitat. Thus the so-called white-bearded gnu (*Connochaetes taurinus albojubatus*) is paler in colour than the normal type, especially on face and buttocks : the chin is white, and white hairs are sprinkled in the black mane, whilst the bunches on the throat are white, tinged with yellow. The wildebeest of German East Africa on the other hand constitute a darker phase, having the body greyish-brown and the mane brown mixed with white. Johnston's wildebeest (*C. taurinus johnstoni*) is likewise brownish ; it has a curious white line crossing the face, just below the level of the eyes, recalling the chevron of the addax antelope. This chevron is very remarkable, and perhaps indicates that the wildebeests and hartebeests are all derived from the same ancestral stock ; indeed, amongst the "bastard-hartebeests" one finds Hunter's antelope (*Damaliscus hunteri*) still retaining this ornament.

Wildebeest show traces of their ancestry in structure also, which affords far more important

evidence than so variable a character as coloration. For example, the horns of young adult individuals frequently exhibit distinct annulations near the bases, these rings being more distinct behind than in front, and tending to disappear with advancing age. A photo-engraving has been published, which represents a pair of these antelopes still living in the Antwerp Zoological Gardens: it was taken several years ago, and the rings on the horns of both animals appear quite distinctly in the picture. I have since several times examined these individuals (in 1900 and 1902): the horns of the bull are now only faintly annulated, those of the cow, however, still retain five rings on each horn, most distinctly marked behind. These more or less evanescent ornaments are analogous to the persistent annulations seen on the horns of the various hartebeests, and are a further indication that both hartebeests and wildebeests are sprung from the same ancestral stock.

The blue wildebeest is specially interesting to naturalists, as it is probably identical with the mysterious creature known to the ancients as the Katoblepas (κατώβλεψ) which was said to inhabit Ethiopia, near the sources of the Nile. Pliny says that the katoblepas was savage, but sluggish, resembling a bull; its head was ponderous, and carried low, so that its glance was directed downward; a flowing mane *descended over the face.*

A PAIR OF BLUE WILDEBEEST.

The lumbering gait of these animals causes them to resemble buffaloes. This photograph may be compared with Pliny's description of the Katoblepas on p. 90.

This description of a heavy-headed, semi-bovine animal applies very well to the blue wildebeest, and the fact of its face being decorated with a "flowing mane" (frontal brush of hair) precludes the possibility of its having been a buffalo: in fact, there is no animal, save the blue wildebeest, which would fit Pliny's description. In spite of the stories of the katoblepas (which is noticed by Elian as well as Pliny), nothing more was recorded of the animal for hundreds of years, when its existence was reported to Europeans from the opposite end of the African continent, and under a new name.

Towards the end of the eighteenth century, when Cape Colony was springing up as a flourishing offshoot of the Empire, and year by year becoming from its advancing civilisation more and more differentiated from the wild regions of the far interior, vague rumours began to be current of the existence of a mysterious animal—the Baas or Bearded Ox—said to exist in the almost unknown country beyond the limits of the Colony. The baas was stated to have short horns, to be bearded on chin and breast, and to be of a gray colour: in this animal one recognises the katoblepas of Pliny—the blue wildebeest of modern times. In 1801 Europeans at last came definitely in touch with the remarkable creature which had excited the wonder of the ancients, for in that year some Dutch hunters shot a specimen near Patanie, and

the description of this individual is so accurate as to leave no doubt whatever as to the nature of the species met with.

"Tail of long black hair, three feet three inches, resembling that of a horse, neck uncommonly thick in proportion to the body. It had a mane, very unlike that of the gnoo, flowing over its shoulders and continuing to the middle of the back. The forehead, like that of the buffalo, was covered with an osseous excrescence, being in fact the roots of the horns, which were terminated in fine pointed extremities, like that of the gnoo. From the centre of the forehead to the nose was an arched or convex protuberance, covered with a ridge of long black hair: and on each cheek, a little below the eye, was a remarkable spot of circular form, rather more than an inch in diameter, naked and apparently glandulous . . . . . close under these glands grew tufts of black hair . . . . . a long black beard, like that of the gnoo, covered the throat from the chin to the breast: the nose and mouth were like those of an ox, but more broad and flat: the general hue of the body was that of an ash-coloured grey."[1]

Subsequent travellers have made us abundantly familiar with the blue wildebeest. Burchell—who though not the discoverer of the species, was the first to introduce it to European museums—

[1] Sir John Barrow: "Journey to the Country of the Boshuanas."

brought home several skins, one of which is still in the National Collection. This species was also obtained by Sir Andrew Smith's party in 1836, and a female wildebeest is figured in his Illustrations of South African Zoology, the illustration being unintentionally comic since the old animal is attended by a remarkably drowsy-looking calf, which seems to be walking in its sleep! Blue wildebeest are said to run in troops of from twenty to fifty individuals, large herds of several hundreds having been occasionally met with. They frequently associate with other animals with which they have no blood relationship, such as giraffe, Burchell zebra and ostrich: they will also mix with other antelopes, such as pallah or sassaby, and large herds of animals as promiscuously mingled as the contents of a Noah's ark may thus be seen enlivening the veldt.

Sir W. Cornwallis Harris pointed out in 1839 the strange preference shown by the blue wildebeest for the society of Burchell's zebra *(Equus Burchellii)*, this odd companionship being parallelled by the sociability of the black wildebeest and the true quagga. The object of this strange bovine and equine alliance probably benefits the zebra by reason of the superior vigilance of the wildebeest: in this connection it is interesting to remember that when Grant and Speke met with *Grévy's* zebra, in the country

north of the Victoria Nyanza, they noticed that a large antelope accompanied the herd and acted as sentinel. The conspicuous stripes of the zebras may, on the other hand, be advantageous to the wildebeest: for should any of the former be suspicious of any danger they would naturally become restless, and the agitated movements of such *brilliantly arrayed* companions would at once catch the eye of the antelopes. We thus see in the comradeship of Burchell zebra and blue wildebeest no chance whim of Nature, but a plain matter of fact system of life insurance in which all parties invest their wits and vigilance, and in which all reap the substantial bonus represented by their mutual safety.

Readers of the adventures of Gordon Cumming, who hunted in South Africa during 1843—49, will remember that he relates how an old bull wildebeest was captured by his men under very curious circumstances. The animal had somehow managed to get one foreleg caught over his horn, and being prevented from withdrawing it by the curvature of the tips, was quite unable to run, so that he fell an easy prey to Cumming's Hottentots. The hunter himself suggests that the old wildebeest had got his leg thus inextricably hooked in fighting with his fellows, and this explanation is doubtless satisfactory enough. There remains, however, another explanation which has not

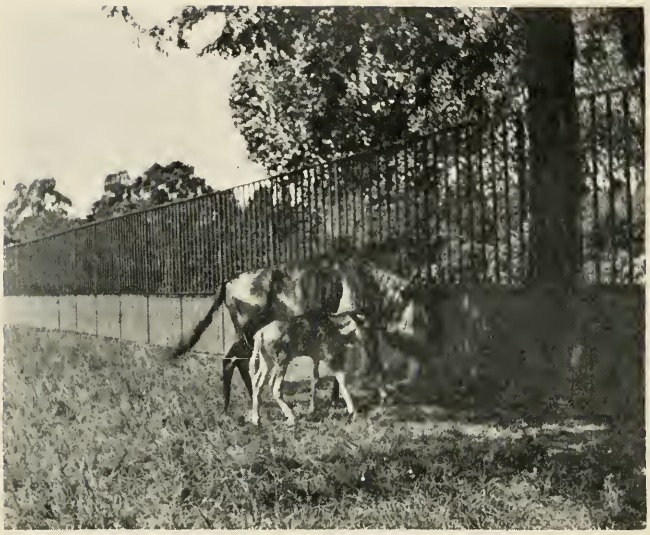
hitherto been offered. It is possible that the old wildebeest had been scratching his huge face with one foreleg passed down between the horns, when in a standing position. In this attitude the head can be easily depressed, to allow the hoof to pass between the horns: I have seen eland and singsing waterbuck easily perform the feat. In being withdrawn, the hoof might readily be caught in the horn, and the animal feeling the check, and standing awkwardly on three legs, would probably struggle to release his foot, his efforts only resulting in locking it still tighter, till at last it became inextricably jammed. This explanation is suggested because though the incident has been commented upon by naturalists no one has hitherto attempted to account for it in this manner.

The blue wildebeest has frequently been brought alive to Europe, and is to-day well represented in zoological gardens, where it is known as the "brindled gnu": the following notes are from observations on captive specimens during the last seven years:—

The disposition of this antelope may be described as a curious mixture of eccentricity, inquisitiveness, and ferocity. Although not equalling the black wildebeest (white-tailed gnu of European Zoos) in the absurdity of its behaviour, *Connochaetes taurinus* is nevertheless one of the clowns of the animal world. It indulges in wild capers on the

slightest pretext, or even for no apparent reason at all, following a visitor for the whole length of the railings in a clumsy canter, with much flourishing of tail and hoofs in the air: if in a more sedate mood, it walks along slowly in a remarkably bovine fashion, the huge head moving slowly up and down at each stride. The blue wildebeest is exceedingly wide-awake, and any unknown object is regarded with a suspicious and prolonged stare. Should the wildebeest be tame enough, the stare is followed by a deliberate walk up to the suspected object: the animal halts within a few yards of it, and has another long stare, usually wheeling off with a flourish of its streaming tail. Wildebeest will investigate human beings with determined and not very friendly curiosity, advancing so near that I recollect being compelled to hastily shut off one persistent individual living in a Continental Zoo, where I was taking photographs; when the door was pulled to, he had already approached to within a couple of yards.

Like many other ungulates, these antelopes are very fond of rubbing themselves against trees, posts, and similar objects: if they can find a damp place in their paddock, they will roll in the mud like buffaloes. Two wildebeest kept together in the same enclosure will frequently indulge in semi-sportive contests, dropping on their knees, and crashing their heavily-armed heads together with



BLUE WILDEBEEST COW AND CALF.

a will. Females with young are extremely watchful and suspicious. One of these cows which was being photographed soon became restless, though the camera was at a considerable distance away from her. Switching her tail from side to side, she stood uneasily watching every movement. At last she uttered a loud, braying snort : the calf which had been lying in the grass at her feet immediately got up, and stood peering in the direction of the supposed danger. Although only one or two snapshots were taken, she remained restless for fully an hour afterwards, and continued to utter her alarm note at frequent intervals.

The first blue wildebeest ever bred in the London Zoological Gardens was born in 1900. The calf was a curious little creature, all legs and no horns, its quaint proportions, fawn-coloured dress, and skittish gambols bearing little resemblance to the heavy-fronted appearance, blue-grey coat, and lumbering gait of the mother. The following description of it is based on notes taken when the calf was five weeks old :—

"General colour of animal blackish brown ; vertex, forehead, and median region of face warm dark brown, the future facial tuft being indicated by a darker vertical patch. Horns blunt, widely-separated, thimble-like projections ; back of ears deep blackish brown : circumocular fur black.

Neck-mane and tail-tuft black: throat-mane brown, mixed with black."

The coat of the young wildebeest very rapidly darkens from pale fulvous to blue-grey, and even at twelve months old is very different from what it was at birth. It may here be remarked that although the adult blue wildebeest is very different in appearance from the adult black wildebeest or white-tailed gnu (*Connochaetes gnu*), the calves of the two species are very much alike, indicating that both forms are sprung from a common ancestor.

NORTHERN GIRAFFE.

## THE NORTHERN GIRAFFE.

"Nabun Æthiopes vocant," says Pliny of the northern giraffe, "collo similem equo, pedibus et cruribus bovi, camelo capite, albis maculis rutilum colorem distenguentibus, unde appellata camelopardalis."

The above quotation indicates a Roman naturalist's method of describing a new species; the individual thus noticed by Pliny being the property of Julius Cæsar, and the first example which had ever been brought alive to Europe. Although modern zoologists will hardly agree with Pliny's statement that the giraffe's neck is like that of a horse, nevertheless its feet and legs do somewhat resemble those of a bull, and its head that of a camel, whilst its ruddy coat, diversified with white, amply justifies the old name of camelopard. Having thus noticed this early attempt at a scientific description, the external characters common to all giraffes may here be conveniently enumerated.

The tallest of all quadrupeds, owing to the great length of the neck and legs, these animals are remarkable also for the great elevation of the withers, which since the back slopes gradually downwards to the rump, causes the forelegs to appear much longer than the hind ones. For this reason also the body, although very narrow across

the chest, is very deep from above downwards: from before backwards, however, it is remarkably short. The upper lip is thick, undivided, and defended by a number of stout bristles: the nostrils are S-shaped, and *not* linear, as always misrepresented in books. The eyes are large and lustrous: the upper eyelid is remarkably stout and thick, and is ornamented with long lashes. The centre of the forehead bears a more or less prominent elevation, forming a horn in some species and a rounded prominence in others. A pair of short horns, covered with hair, and *always unequal* in size, surmounts the vertex of the head. The ears are large and mobile. The tongue is very extensile, about seventeen inches long,[1] and covered with black pigment. derived from the *rete mucosum*: this organ can be coiled round various objects like the trunk of a tapir.

The neck of all giraffes bears a short mane, extending from the occiput to the withers; the shoulder-blades project forward on each side of the chest in a very prominent manner; the knees are protected by thick pads or callosities. The end of the tail is laterally compressed and bears a long tassel of hair, *which grows from its under surface*, and does not encircle it as wrongly represented in books. Giraffes, both wild and in confinement, have a curious habit of pulling the hair out of their

[1] The tongue of a *dead* giraffe, according to Sir Everard Home, can be stretched to this extent.

tails as shown in the figure of the southern species published in this work. Until within the last few years it was generally supposed that only one species of giraffe was distributed throughout Africa : but it has become evident that at any rate the Somali species (*Giraffa reticulata*) is a distinct form. *G. reticulata* may be described as a chestnut-coloured animal covered with a network of white lines, its ornamentation thus differing widely from that of ordinary giraffes.

It is now also considered possible that the ordinary giraffes may be separable into a northern form not occurring south of the Tana River, and a southern form originally extending from that boundary as far as the Orange River in Cape Colony : the western giraffe (*G. peralta*) may perhaps also be distinct. Assuming that the northern and southern forms are separable, the chief differences between them may be formulated as follows :

| Northern giraffe (*Giraffa camelopardalis L.*) | Southern giraffe (*Giraffa capensis Less.*) |
|---|---|
| (*a*) Differences in *structure*. | |
| 1. Muzzle broad. | Muzzle narrow and tapering. |
| 2. Third horn 3-5in. long, in centre of forehead. | No third horn, but a rounded eminence in centre of forehead. |
| 3. Skull of northern giraffe largely covered with osseous excrescences. | Skull of southern giraffe much smoother. |
| 4. The dried skull of *G. camelopardalis* has the posterior edge of the bony palate rounded. | The dried skull of *G. capensis* has the posterior edge of the bony palate *pointed*. |

In adult males, even during life, the nodules in the supra-occipital region become very prominent:[1] in a variety discovered in Uganda by Sir H. H. Johnston, they are so much developed as to constitute the animal a five-horned giraffe.

*(b)* Differences in *coloration*.

| | |
|---|---|
| 5. Upper part of face light fawn-color: median area (base of horns to muzzle) dark fawn. | Upper part of face greyish-white. Median area blackish brown. |
| 6, Mane reddish brown. | Mane dark chestnut. |
| 7. Ground colour white or fawn, marked with reddish chocolate spots. Young bulls having the ground colour white are very beautiful animals. | Ground colour varies from white to fawn, spotted with darker fawn spots, often becoming almost black along the back, as seen in my photograph of this species. |
| 8. The body markings consist of sharply defined spots of polygonal shape: they are relatively few, and in old bulls there is a *saddle-shaped area on the back* in which the spots are separated by whitish lines, recalling the network-pattern seen on the Somali giraffe. In cows of *G. camelopardalis* these whitish lines may be replaced by pale fawn. | Body markings consist of irregularly-shaped spots with deeply indented outlines, and are *relatively numerous*. |
| 9. Abdomen and legs below knees and hocks *almost* free from spots: but faint markings in these situations may persist to extreme old age (twenty-seven years). | Abdomen and legs below knees and hocks profusely spotted. |

Although the foregoing differences have only been fully recognised of late years, it should be

[1] I was much struck with this in 1902 when studying the old bull giraffe then living in the Jardin d'Acclimatation at Paris. This patriarch had a pair of incipient horns situated at the back of the head immediately above the insertion of the nuchal muscles. Other naturalists appear to have discovered these nodules independently and have aptly designated the anterior, middle, and posterior projections as fore, main, and mizzen horns.

SOUTHERN GIRAFFE.

Note the slender formation of the muzzle, the irregular-shaped spots and the mottled legs. A chain of blackish spots is seen along the spine. In walking slowly the tail hangs limp: it will be noticed that the terminal tassel has been pulled out by the giraffe.

remembered that M. Geoffroy St. Hilaire as long ago as 1827 pointed out that the northern giraffe was distinct from the southern form.

Recorded measurements seem to show that *G. camelopardalis* is on the whole a taller animal than *G. capensis*, though the height of both species averages about eighteen to nineteen feet in bulls, and sixteen to seventeen feet in cows. The five-horned giraffe of Uganda may be taken as the best developed type of the northern animal: one of the examples shot in 1900 (now in the National Collection) measured twenty feet in height. Paterson's type specimen of the Southern giraffe (shot in 1777-79) was according to Pennant only fifteen feet high, hence probably immature. The Somali and Western giraffes are as yet too imperfectly known for us to estimate their average stature.

The *Northern* Giraffe has been so long known to Europeans and its history is so interwoven with the legends of antiquity, that a study of its history and habits constitutes a most facinating chapter of Zoology. Our knowledge of the animal may be tabulated as follows :—

(*a*). *Classical period:* The oldest known picture of the animal is to be found on the tomb of Beni Hassan in Egypt. The ancients were more or less familiar with it, and it appears in many of

their quaint drawings, perhaps the most remarkable of these sketches being that which represents the animal as semi-domesticated and carrying a load on its back. Whether the ἱππάρδιον of Aristotle is identical with *Giraffa camelopardalis* is doubtful: but the Greek writer Agatharchides (B.C. 130) has certainly left a recognisable description of the animal, and both Ælian and Strabo mention the giraffe. We have already noticed Pliny's description of the first living example ever brought to Europe, obtained from Alexandria by Julius Cæsar, who exhibited it at Rome: subsequent efforts to capture the camelopard were very successful, and it is recorded that Gordian III. had ten alive at once, a record which has never been approached by any modern Zoo.[1] Other emperors, as Commodus and Aurelian, also exhibited this animal: but after the fall of the Roman Empire the northern giraffe remained long unknown in Europe, and people began to believe that so extraordinary an animal was only a mythical creature like the griffon and the wyvern, the phœnix of Egypt and the roc of Madagascar.

*(b) Mediæval period.* During the middle ages a few giraffes were sent across the Mediterranean: Frederick II. of Sicily (1198-1227) had living specimens in his menagerie: and at the end of

[1] I understand, however, that Carl Hagenbeck, the well-known wild beast merchant, had as many as thirty-five giraffes for sale during the summer of 1876—probably not all at the same time.

the fifteenth century the "Soldan of Egypt" sent one to Lorenzo di Medici.

*(c) Modern period.* Another blank intervened, and men again began to question the existence of the giraffe: but all doubts were permanently dispelled by Lieutenant Paterson, who had been commissioned by Lady Strathmore to botanise in the then unknown region of Caffraria. He sent home an immature male specimen of the *southern* giraffe which he had shot: this example was presented by Lady Strathmore to John Hunter the celebrated surgeon, and the skull with some of the bones is still in the Royal College of Surgeons' Museum. After exhibition in the College of Surgeons' collection, Lieutenant Paterson's giraffe was eventually acquired by the British Museum, and was still extant, though in bad condition, as late as 1843—a historic relic which had in its day marked the dawn of a new era of scientific activity.[1]

In 1827 the existence of the giraffe in *North* Africa was practically demonstrated by the Pasha of Egypt (Mohammed Ali) who sent one to Windsor for George IV. and another to Paris, where the animal created quite a sensation, dense crowds of over 10,000 persons flocking to see

1 The southern giraffe had previously been seen (1761-2) by Brink and Hop, who were travelling in Namaqualand by orders of Governor Tulbagh.

her.[1] The Pasha sent a third giraffe to the Sultan, and a fourth to Venice, at the same time. George IV's specimen was the weakest of the four and soon becoming unable to stand, died after a few months in England.

Finally, in 1836, four young camelopards, none of them more than two years old, were safely received at the London Zoological Gardens.[2] The animals—three males and a female—flourished, and became the founders of a long line of English-bred giraffes, the first calf being born on June 9th, 1839; it was followed by five others, the old cow eventually dying at the age of eighteen years. The giraffes continued to breed: and between the arrival of the original animals in 1836 and the death of the last of the old stock in 1892, no less than thirty camelopards were exhibited in the Regent's Park menagerie, seventeen of which had been born there. I well remember the last two animals of this long series, which connected the business-like era of to-day (in which almost every part of Africa is being diligently exploited by companies) with the long-vanished past, when huge areas of the Dark Continent now colonised were unknown regions, teeming with great game. *Eheu fugaces!*

1 The famous Paris giraffe may now be seen stuffed in the Natural History Museum of the Jardin des Plantes.

2 A series of the milk teeth of these individuals is preserved in the Royal College of Surgeons' Museum.

NORTHERN GIRAFFE (bred at Antwerp).

Twenty-three years old. The tassel in the tail has been allowed to grow by the animal and reaches below the hocks.

Owing to the closure of the Soudan by the Mahdists, and the unsettled political conditions arising therefrom, the death of the last of the old stock caused a long hiatus (1892-1902) to intervene before the northern giraffe was again exhibited in the London Zoo. A pair of young animals presented by Col. Mahon, and obtained singularly enough from the same province—Kordofan—as the giraffes of 1836, arrived in London in the summer of 1902 and are still (1904) flourishing in the Regent's Park menagerie.

The northern giraffe has frequently been exhibited in the various zoological gardens of the Continent: a fine pair of adult animals were living at Berlin in 1899, and the Jardin d'Acclimation at Paris long possessed a herd of Abyssinian giraffes which bred repeatedly in the garden, the last survivor—an old bull—dying in June, 1902. The Antwerp series included eight Belgian-born giraffes, born during 1871-78: the last of these still survives, and bears her twenty-three summers with the elasticity of youth.

It will thus be seen from the foregoing account that the northern giraffe under common-sense treatment does well enough in captivity, living to a considerable age, and even breeding with regularity, so that it seems probable that were it not for the enormous cost of the animals (£700 or £800 apiece) they might be systematically bred in

Europe with no more trouble than is expended on valuable cattle.[1] During the long period that has elapsed since the Pasha of Egypt sent the first living example to George IV., a considerable amount of information has been collected regarding the northern giraffe, from observations on captive specimens: and now that the Soudan has been re-opened, it seems probable that much more material will be available.

The following observations are based upon a study of somewhat extensive material, consisting of twelve living giraffes, augmented by examination of various photographs from life of these and other individuals, and by a study of six museum specimens, the total number of animals thus considered (including those represented by the photographs) amounting to no less than twenty-six individuals.

The two-year-old bull has the third horn about one inch long. In passing from youth to maturity, the blotches on the hide grow darker, the pigmentation spreading from the centre to the circumference, while the interspaces become lighter; old cows are comparatively paler than old bulls. In advanced age the darkening of the hide becomes noticeable over a saddle-shaped area on the back;

1 According to the late Sir Richard Owen, the horns of the young giraffe are apparent before birth. It is born with the eyes open. The young animal can stand two hours after birth, and can walk after ten hours: when a day old, it begins to gambol, and can run well twelve hours later. After three weeks it begins to take vegetable food.

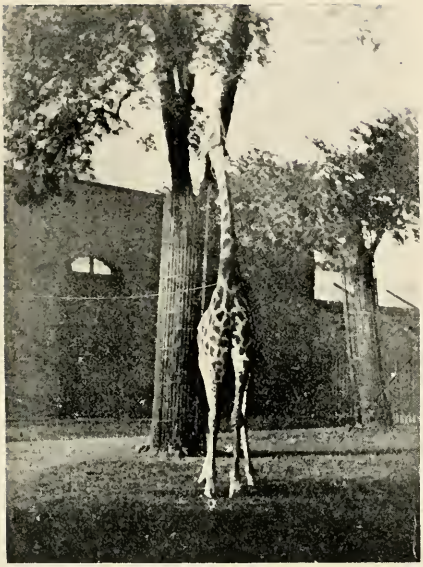
indeed, bulls over sixteen years present a remarkable appearance, the interspaces forming a creamy network recalling that found all over the Somali giraffe: adult cows, however, even of greater age, may show only faint traces of this network. A remarkable pair of bony protuberances develop in the supraoccipital region of adult bulls, and are easily recognisable during life, projecting under the skin: in the Uganda giraffes these protuberances develop into horns as already stated. Both sexes of the northern giraffe have a variable amount of curly hair situated between the base of the paired horns and the muzzle. Some individuals (as in an eighteen-month old cow at Antwerp) have the ends of the paired horns ornamented with long, backwardly-directed tufts of drooping hair. In extreme old age—twenty-seven years—the legs become bowed. Wild-caught giraffes are often darker than European-bred animals.[1]

The anatomy of the northern giraffe has been repeatedly investigated, and will only be lightly touched on here. This animal is remarkable in occasionally possessing a gall-bladder: as a rule this organ is absent, but Sir Richard Owen found one with a bifid fundus in a northern giraffe which

1 The most beautiful giraffe which I have ever seen is the young eighteen-month old bull, recently added to the collection of the Jardin d'Acclimatation, Paris. The ground colour of this animal is pure creamy white: compared with this fourfooted Adonis the young bull now in London (ground colour suffused with fawn) is a very inferior specimen.

he dissected in 1838, and Col. Gordon in the supplement to the seventh volume of Buffon's Natural History records a similar case—probably in the southern species. According to Dr. Crisp, the liver and spleen of *G. camelopardalis* is frequently infested with parasitic acephalocysts, the size of a hen's egg: various cysticerci and cercariae attack these huge animals, and giraffes may also be the hosts of liver flukes *(Fasciola gigantea)* allied to the flukes which infest sheep.

But little appears to have been recorded of the habits of *G. camelopardalis* as distinct from *G. capensis*: for though every work on African hunting contains reference to giraffes, these almost invariably deal with the southern and not the northern species. Until within the last few years, indeed, few Europeans, save Dr. Rüppell and Sir Samuel Baker, appear to have had any field experience of *G. camelopardalis:* such observations as have been recorded demonstrate, however, that in habits it resembles *G. capensis*, wandering about in troops in open bush country, browsing on the tall tops of the mimosas, and going for long periods without drinking. Ever alert and watchful, the northern giraffe when feeding is further protected from danger by its singular coloration, for the blotched hides of a troop standing in a mimosa grove will effectually screen them from observation, by harmonising with the



SOUTHERN GIRAFFE (Browsing).
Note the curious resemblance to a lichen covered tree trunk.

lights and shade of the surrounding thicket. When out in the open the speed of these colossi readily enables them to distance most of their enemies. As may be gathered from observation of menagerie specimens, giraffes when walking do not move their fore and hind legs of *opposite* sides like ordinary mammals, but the fore and hind leg of the *same* side, like a camel. They have but two paces, a walk and a gallop, breaking at once from one into the other, as I was once fortunate enough to observe in a Continental Zoo : the lucky snapshot taken on that occasion is reproduced in this book. Giraffes are well known to be silent animals. I once heard the southern giraffe still living in the London Zoo give a kind of coughing sneeze—the only recorded occasion, I believe, of these animals ever having been known to make *any noise at all!* It was, however, probably caused by some irritant in the nasal passages, and cannot be called a *vocal* sound. In captivity both *G. camelopardalis* and *G. capensis* have a curious habit of licking the walls of their enclosure for half an hour or more at a time : the reason of this is not known. Young individuals in menageries will indulge in clumsy gambols, and strike out playfully with their forefeet : a blow delivered, even in play, by so powerful an instrument, would probably brain any unfortunate attendant on whose head it happened to alight. In spite of the gentle demeanour of

these animals, bull giraffes are said to fight among themselves, swinging their long necks like animated flails, and striking each other violently with their armed heads. Giraffes are very nervous, and hence very awkward animals to transport, as they are liable to break their necks by suddenly twisting about in their travelling box; it will be remembered that some years ago Messrs. Barnum and Bailey lost a fine specimen—at that time one of the very few in captivity—from this cause.

The above account practically completes our present knowledge of the *northern* giraffe, considered as a distinct species. It is to be regretted that comparatively little is known of its habits in the wild state, so that one is compelled to turn to menagerie specimens for information: these at best amongst their artificial surroundings can give but a poor idea of the real giraffe. An acclimatised herd of camelopards, roaming half wild over some English gentleman's park, would doubtless afford the naturalist much instruction as to their habits; and it would indeed be thrilling to see a troop of these beautiful giants striding over the greensward, their towering forms darkening as they paced the woodland glades, and glistening with a coppery sheen as they swung out again into the hot sunshine. Unfortunateiy "nature study" on so costly though magnificent a scale is not as yet included in the programme of learned societies:

as for private enterprise, few naturalists are millionaires, and the progress of zoology, like that of many of her sister sciences, is too often hindered by the *res angustae domi.* It seems possible, however, that the zoological gardens of to-day will be eventually replaced by zoological *parks*, in which many of the animals will not be confined in cages, but allowed to wander over extensive runs in a state of semi-freedom. Under such circumstances, there would naturally arise a demand for animals whose large size and strange exterior would lend interest and impressiveness to the landscape : and in such an exhibition the northern giraffe, with its towering stature, its immense bulk, and its strange almost antediluvian outlines would find its due place.

# THE PIGMY HIPPOPOTAMUS.

In spite of the progress which has been made in the study of natural history during the past thirty years there still remain a considerable number of interesting animals which continue to be rare and obscure, although they have long been known to science. Thus the colocollo—a handsome tiger-cat—was for many years only known from a single skin; the Derbian eland, though discovered in 1846, is even to-day numbered amongst the rarest of antelopes; our knowledge of the West Indian seal is not only fragmentary, but out of date: and only two examples of Brannick's paca—practically a huge guinea-pig—have been seen since the type specimen was taken in Peru nearly thirty years ago.[1]

The name hippopotamus, like that of whale or elephant, is usually applied to mammalia of great size, such as the living *Hippopotamus amphibius* of Africa, or the long-extinct *H. major*, of Britain. Even the casual visitor to a zoological garden retains a vivid impression of the common African species as a monster silently swimming round its tank, submerging itself without a ripple to rise again with the same remarkable noiselessness; or

1 The two additional specimens of Brannick's paca were not taken till 1904.

PIGMY HIPPOPOTAMUS (in the Natural History Museum).
Note the relatively small face, the depressed orbits, and the *convexity* of the head from before backwards.

perhaps he remembers it as a huge, inert mass, reposing, uncouth and hideous, on its bed of straw. Nevertheless, as the remains of pigmy elephants have been found in the caverns of Malta,[1] so also the great hippopotamus of to-day has a dwarf congener barely the size of a heifer, inhabiting a restricted area of Western Africa, and perhaps also ranging into the Congo Forest.

The pigmy hippopotamus (*Hippopotamus liberiensis*) stands about thirty inches high at the shoulder, and measures about sixty-five inches in length, exclusive of the short tail. The average weight of the animal is said to be about four hundred pounds, and the maximum estimated weight (probably seldom attained) is seven hundred pounds: the males are larger than the females. Living specimens are slaty-black on the back, greenish grey on the sides, and greyish white beneath, but the hues of the skin probably vary according to the moisture or dryness of the hide: at any rate a very little observation of the common hippopotamus in menageries will show that the larger species, when recently emerged, is brownish-blue above and reddish below, but that when dry it is blackish-brown. The same rule may apply more or less closely to its dwarf congener.

Although to the superficial observer the pigmy

[1] Curiously enough the bones of giant dormice have also been found in these caves.

hippopotamus is but an absurdly faithful replica of its giant relative, careful examination will demonstrate that the following differences exist between the two :—

1. The face of the pigmy hippopotamus (as compared with the cranium) is relatively smaller than that of *H. amphibius*, so that the eye of the lesser animal is much nearer the centre of the skull.

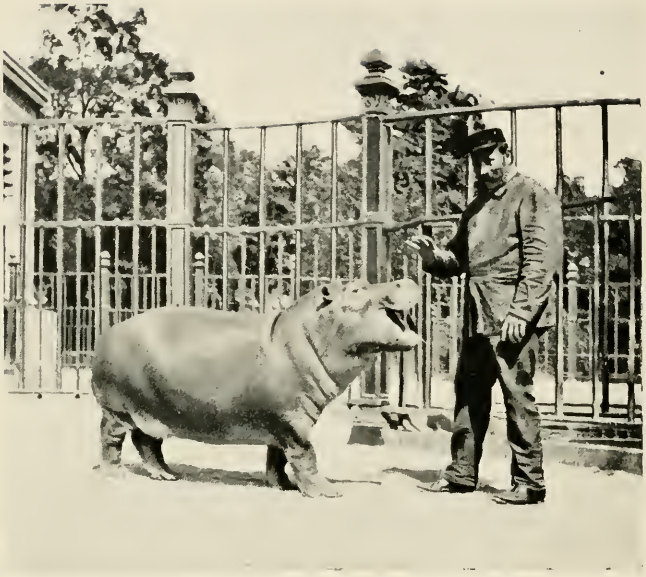
2. The lower jaw of the pigmy hippopotamus carries only two incisors, instead of four, as in the larger species.

3. The forehead of the Liberian animal is convex from before backwards, and also from side to side, but that of the common hippopotamus is *concave* in both directions.

4. The orbits of the lesser species are never elevated : but those of the larger one are always prominently developed.

5. An examination of the dried skulls of both animals will demonstrate that the brain cavity, ear-capsules, and orbits of *H. liberiensis* are relatively larger than those of *H. amphibius*.

These characters are of course best seen by contrasting adult specimens of both animals, but a comparison of a full-grown pigmy hippopotamus with even a calf of the common species, will amply demonstrate the essential differences between the two. An adult *H. liberiensis* is about the size of a thirteen month old calf of *H. amphibius*



CALF OF COMMON HIPPOPOTAMUS (13 months old).

Note the relatively large face, the elevated orbits, and the *concavity* of the head from before backwards.

The *pigmy* hippopotamus even when adult never exceeds the size of the calf here shown.

and as it is extremely interesting to compare the two forms when of the same relative size, a photograph of a young calf *amphibius* of this age has been selected for comparison with its dwarf congener: most of the points of distinction can be readily made out by studying the illustrations contained in this book.[1]

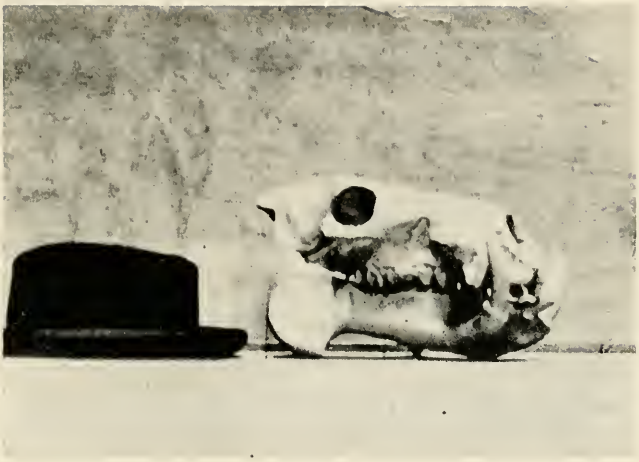
Mr. C. E. Bidwell, writing in 1839 to the Zoological Society, stated that although "the" hippopotamus was not found in the Sierra Leone River, it was very abundant in the Scarcies, fifty miles off, one of the very rivers now known to be a haunt of *H. liberiensis:* and it seems possible that this casual communication was really a foreshadowing of the discovery of the Liberian hippopotamus.[2] The animal, however, was first definitely made known to science by Dr. Morton of Philadelphia, in 1844. The doctor stated that four years previously he had been informed by a returned African traveller that there existed in Liberia a new species of hippopotamus no bigger than a heifer: and added that this statement had been confirmed in 1843 by the arrival in America of a collection of skulls belonging to West African

[1] It is interesting to note further that the bones of the pigmy hippopotamus show considerable affinity with those of *H. minutus* (Cuvier's "petit hippotame fossile"), which have been discovered in a cave in Cyprus.

[2] It seems possible, however, that the Liberian hippopotamus, although *not then recognised as distinct*, was known to Europeans long before 1839. In the Jardin des Plantes Museum there is an old specimen labelled "Hippotame, Buff. Supp. III. 62, *H. amphibius L. du Sénégal!*"

mammalia—the series including two crania of the new animal. Dr. Goheen, of Monrovia, who had obtained these during his residence in West Africa, had from the first suspected that they indicated a new species, a deduction abundantly confirmed by subsequent examination of the skulls. Dr. Morton finally sent the two specimens, under the care of Sir Chas. Lyell, to London, where they were carefully examined by Sir Richard Owen and Dr. Falconer, the author of the "Fauna Sivalensis." Falconer regarded the finding of the pigmy hippopotamus as "one of the most interesting and remarkable discoveries in recent zoology." Casts were carefully made of the best of the two skulls, which were both duly returned to their owner. Dr. Morton published an account of his specimens, accompanied by two wood engravings, in the Proceedings of the Academy of Sciences of Philadelphia for 1844. This paper reappeared in 1840, after careful revision, illustrated by several excellent plates, under the title of "Additional observations on a new living species of hippopotamus of Western Africa." Dr. Morton presented a copy of his revised treatise to Sir Richard Owen : this copy, inscribed with the author's handwriting, is now in my possession, and constitutes a very interesting memento of an important zoological discovery.

In spite of the advance of science during recent



THE PIGMY HIPPOPOTAMUS:
Cast of the original skull described by Dr. Morton.

years, but little has been added to our knowledge of the pigmy hippopotamus since Morton's day. It would be reasonable to infer from its non-elevated orbits that the Liberian animal is not so aquatic as the common species, which from the situation of the eye on the summit of the face is well adapted for river life.[1] This inference is borne out by ascertained facts, the pigmy hippopotamus having been found to frequent marshes and damp situations in woods rather than rivers, and to often occur as far distant as two or three miles from any considerable stream. Resembling the common hippopotamus in its sluggish movements and its tenacity of life, the pigmy species differs from it in consorting in pairs only, and not in herds. Largely nocturnal in its habits, the dwarf hippopotamus feeds on fruits and grasses, wandering over large areas of forest, and hiding away during the daytime—being in fact a hippopotamus which has adopted the terrestrial habits of a wild pig. Like a pig also, it is said to be good eating and the negroes pursue it on that account. From its roving habits the dwarf hippopotamus, though nowhere common, is said to be known everywhere in its own distributional area: several localities whence specimens have been obtained are recorded, such as the Du Queah River and Fisherman Lake.

[1] The common hippopotamus having both nostrils, eyes, and ears all on the same elevated level, can smell, see, and hear without exposing itself much in the water.

The best known region, however, is the country adjacent to the banks of the St. Paul's River, a stream which rises in the mountains of Guinea, and flowing through Liberia empties itself into the Atlantic north of Cape Messurado. In 1843 *H. liberiensis* occurred in a tract of land extending from the banks of this river to a distance of three miles from the water, and was quite abundant one hundred and fifty miles from the coast: it probably still occurs in that region.

Dr. Morton in his paper expressed the hope that considering the small size of the pigmy hippopotamus it might be found an easy task to capture living examples for zoological gardens: but unfortunately, like many other West African mammals, this fourfooted dwarf yet remains a desideratum in the menageries of Europe and America, the only example ever sent over alive being the calf which was received at the Dublin Zoological Gardens, in 1873.[1] This example was obtained on the Little Scarcies River, and was presented to Mr. Pope Hennessey by the negroes who captured it. He sent the animal home: on its arrival in Liverpool, several photographs were taken of it, and these are extremely valuable, being the only sun-pictures of a living pigmy hippopotamus that have yet been taken. The

[1] It has been stated in a recent work on natural history that no living example of the pigmy hippopotamus has ever been brought to Europe; such, however, is not the case.

little creature was then shipped for Dublin; but unfortunately reached its destination in a dying state, and only breathed for about five minutes after reaching the Gardens. The body was carefully dissected: an account of its anatomy will be found in the Proceedings of the Royal Irish Academy for 1873-4.

In consideration of the great rarity of *Hippopotamus liberiensis*, I have compiled a census of museum specimens which may interest students. The examples thus recorded are as follows:—

1. Skull of young adult animal, with complete dentition: nasal region and orbit injured by slugs. Casts of this skull are now in the Royal College of Surgeons' Museum and in the Natural History Museum at South Kensington.

2. Skull of aged animal, with obliterated sutures, worn teeth, and lower jaw missing. This and the preceding are the specimens originally described by Dr. Morton, in 1849, and are now in the Museum of the Royal Academy of Sciences, at Philadelphia.

3. Mounted skeleton, from example obtained on the St. Paul's River, Liberia, described in 1852 by Dr. Leidy, in the Proceedings of the Academy of Natural Sciences of Philadelphia, and still preserved in the Museum of that Society.

4. Skin sent over in pickle, and described in 1868 by M. Alphonse Milne Edwards. He figures

this example as suffused with a reddish hue. This tint was perhaps due to the moisture of the skin, still sodden with the preservative fluid, rather than to any chemical action of the fluid itself, as has been suggested. The cranium and skeleton of the same animal were also described by Milne Edwards. Perhaps it is the skin of this individual which is now mounted in the Jardin des Plantes Museum, and labelled as a female from West Africa, presented by Prince Napoleon. As already mentioned, there is also

5. A second small hippopotamus in the Paris collection. Though labelled as *H. amphibius*, it seemed to be quite as likely to be the pigmy species, especially as it is said to have come from Senegal: it is very old and badly stuffed, and the tail is missing. This dubious specimen was presented many years ago by M. Gerardin.

6. The sternum of *H. liberiensis* (absent from Milne Edwards' specimen) was described and figured by Peters, in 1873, in his paper "Ueber den Brustbein des *Hippopotamus liberiensis*."

7. The calf sent alive to Dublin, in 1873, is now mounted as a stuffed specimen in Trinity College Museum, Dublin: the skeleton of the same animal, together with its brain and several of the abdominal viscera, has also been carefully preserved, and an outline sketch of the brain appeared in the Proc. Royal Irish Acad. (Session 1873-4). Several

specimens collected by Dr. Büttikofer, on the Du Queah River and Fisherman Lake, in Liberia, are now in the Leyden Museum, and Dr. Jentink kindly informs me that these consist of three males, being (8) an adult, (9) a young one, (10) a very young calf. There are also several osteological specimens of *H. liberiensis* in the Museum, namely, (11, 12) two skeletons, and (13) a skull of this species.

14. The Natural History Museum (South Kensington) possesses a fine mounted adult example of this animal, obtained by Dr. Büttikofer, on the Du Queah River; as now preserved, the general colour of this specimen is greenish black. It was acquired by the Museum in 1887, and has been very well stuffed, the modelling being excellent. The skeleton of the same animal is also in the National Collection, and is very interesting, as the lower jaw contains a minute right *outer* incisor—whether this is due to reversion or to redundancy is a moot point. It is curious to remember that on the other hand the skull of the animal presented by Prince Napoleon to the Jardin des Plantes has no lower incisors at all!

15. Early in 1893 the Academy of National Sciences at Philadelphia received a skin and disarticulated skeleton of the pigmy hippopotamus. Mr. Whitner Stone kindly informs me that the skin was removed from the pickle in which it had been

brought over, and mounted by the museum taxidermist, the example thus stuffed figuring amongst the attractions of the Liberian department in the Chicago Exhibition. This specimen is now in the Museum of the Academy of Natural Sciences: judging from a photo-engraving of it now in my possession, the taxidermist has made the legs much too stilted, although the characteristic inter-orbital and antero-posterior convexities of the head have been correctly reproduced.

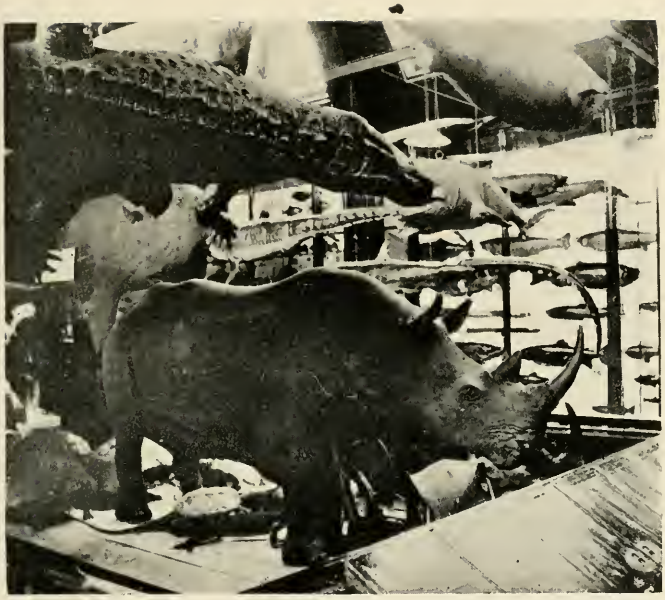
This census practically completes our present knowledge of the pigmy hippopotamus. Considering its moderate size, and the length of time it has been known, one might have expected this little ungulate to have become at least moderately common in the great zoological gardens of Europe, where rarities presumably as difficult to obtain, are frequently exhibited: one may mention as instances the Tasmanian thylacine, the fossa of Madagascar, the snow leopard, the sable antelope, the black rhinoceros, the echidna, the kiang. Moreover, there is good reason for desiring the exhibition of *H. liberiensis* at an early date. We have seen that the little beast, alas for him! is succulent, and is hunted because he is good to eat. Considering the limited range of the animal, this points to eventual extermination. The naturalist remembers with regret how the northern sea-cow, the great auk, and the dodo were relentlessly

slaughtered by old-time mariners: these sailors being white men, presumably enlightened by some degree of civilisation. One cannot expect the natives of so savage a country as Liberia to be *more* merciful than whites towards the beasts of the chase: or to show any sentimental scruples about destroying the toothsome pigmy hippopotamus, whose dull wits, defenceless jaws, and limited range so heavily handicap him in the struggle for existence. The protection of *Hippopotamus liberiensis* is a matter of urgency. *Carpe diem!*

# THE WHITE RHINOCEROS.

"Solitudinem faciunt, pacem appellant." So wrote Tacitus centuries ago: but while the methods practised by the ancients were crude enough, unhappily in later times also men have made a wilderness, and called it peace. To the naturalist the story of the development of South Africa by Europeans, as narrated in countless volumes of history and travel, of colonisation and sport, reveals so dire a transformation from a paradise to a (zoologically) dead world, that it may be interesting to consider briefly the history of this change.

The early colonists found South Africa teeming with a magnificent profusion of great game animals, abundant even in the colony itself, whilst the far interior was tenanted by a countless mammalian population of marvellous diversity and interest. The lion abounded everywhere, preying on giraffe and buffalo, quagga and zebra; the leopard, stealthy, yet daring, carried off the settlers' dogs; the cheetah frequented the cracked mud-flats of the great Karroo, which it shared with bright-coloured troops of blesbok and squadrons of quagga and black wildebeest; in the rivers floated the slate-coloured forms of countless hippopotami, which made the air resound with their bellowings, whilst similar unwieldly monsters crashed heavily



*By permission of the Hon. Walter Rothschild, M.P.*

WHITE RHINOCEROS IN THE TRING MUSEUM.

through the tangled vegetation on the banks, making wide lines in their repeated passage. The noble family of antelopes exhibited in bewildering profusion its splendid series of animal types—eland and kudu, gemsbok and hartebeest, springbok and duiker : the mountain ranges were ornamented by the savage beauty of the Cape zebra, and by the chamois-like grace of the little klipspringer. In the forest land browsed troops of stately giraffes, whose variegated hides were scarcely distinguishable from the mottled trunks amongst which they wandered; whilst the imposing presence of great herds of elephants, their huge ivory tusks gleaming in the hot sunshine, and their great ears flapping to and fro, completed a picture of wild life which in recent times has had no rival, either on the North American prairies, once teeming with countless bison, or on the South American pampas, the home of jaguar and puma, of tapir and peccary, of huanaco and rhea. Not only so, but even if one could bring to life that marvellous assemblage of antediluvian animals which the genius of Cuvier and Buckland, of Marsh and Cope has reconstructed from the fossilized relics of bygone ages, till one saw again the long-extinct pterodactyl sailing through the groves of pterophyllum on its parachute-like membranes, or beheld the terrible sabre-toothed tiger *(machairodus)* stealing like a shadow after the three-toed horses on the

uplands of Pliocene France—could one exchange the mammalia of to-day for their prehistoric ancestors, substituting the mastodon for the elephant, the tinoceras for the hippopotamus, the brontops for the rhinoceros, the helladotherium for the giraffe, the hipparion for the zebra, and the sabre-toothed tiger for the African lion—even then the animals thus conjured up by so preposterous a transformation, would hardly exceed in interest and variety the magnificent fauna of South Africa as it appeared to the astonished gaze of the early settlers.

During the decline and fall of this splendid fauna (caused by the introduction of firearms), the same ruin fell alike on all the larger game animals. Rarity became a mere prelude to extinction, either local or general: and since the same miserable history applies in varying degree to each of the larger species, we may, on the principle of *ex pede Herclem*, select for special study one animal to stand for all the others. For this purpose we proceed to consider an eminently typical form—the great white rhinoceros.

The white, square-mouthed, or Burchell's rhinoceros (*Rhinoceros simus*)—wit rhenoster of the Boers—chuckuroo and mohohu of the Bechuanas and Matabele—is, after the elephant, the largest of all terrestrial mammals, standing six feet high at the shoulder, and attaining a length of sixteen

feet, measured from the base of the anterior horn to the tip of the two foot tail: the maximum weight of this rhinoceros has been estimated at five thousand pounds (Andersson). The white rhinoceros is a larger animal than the black species, from which it may at once be differentiated by the square, rubber-like and non-prehensile upper lip. Other distinguishing characters of *Rhinoceros simus* are the slit-like nostrils, the characteristic position of the eye behind the line of the second horn, the semi-tubular ears, and the great length of the shapeless head—these points amply justifying the refusal of the late Joseph Wolf to depict the white rhinoceros as resembling its black congener in all respects, save for the square upper lip. He said that surely other important differences existed, and indeed, when closely compared, the two animals are really very unlike each other, as may be seen from the following table :—

| *White Rhinoceros.* (*Rhinoceros simus*). | *Black Rhinoceros.* (*Rhinoceros bicornis*).[1] |
|---|---|
| 1. Upper lip square, non-prehensile, and adapted for grazing. | Upper lip pointed, prehensile, and adapted for browsing. |
| 2. Nostrils slit-like, elongated, and narrow. | Nostrils small and rounded. |
| 3. Eye situated entirely behind line of second horn. | Eye situated behind *axis* of second horn. |
| 4. Ears semi-tubular and scantily tufted. | Ears open: fringed on upper edge. |
| 5. Head much elongated. | Head less elongated. |
| 6. Feet broad, leaving a wide spoor or footmark about 36in. circumference. (Kirby). | Feet smaller: spoor about 27in. circumference. (Kirby). |
| 7. Size of animal very large, 6ft. at shoulder. | Size smaller up to 5ft. 8in. at shoulder. (Baker). |

[1] Some naturalists have recently adopted *Diceros bicornis* as the scientific name of the black rhinoceros.

The white rhinoceros, like its congener, carries two horns, but an examination of a good series of museum specimens will speedily demonstrate that the front one is always flattened anteriorly in the white species, and rounded anteriorly in the black. Moreover, *R. simus* has always the anterior horn extremely bristly at the base, and exhibiting a whitish colour on section. The anterior horn of the white rhinoceros shows great individual differences of curvature: two well marked types may be recognised. The first type (mohohu) is the commoner: the horn is curved backwards. The second type (kabaoba) is directed forwards, so that the anterior surface is often much worn by repeated contact with the ground when its owner grazes: this is well seen in the type kabaoba horn which Col. Steele presented to the British Museum many years ago. The kabaoba was long described as a separate species under the name of *Rhinoceros oswellii*, but this distinction is now abandoned, as intermediate forms between the two have been observed. Maximum recorded length of anterior horn (mohohu) 62½ inches: of anterior horn (kabaoba) 56½ inches. Maximum recorded length of posterior horn two feet. The posterior horn is often little more than a mere dermal excrescence, and it was probably from this cause that the natives in Sir A. Smith's day informed him that a race of one-horned rhinoceroses inhabited South Africa.

INDIAN RHINOCEROS IN MUDHOLE.

Showing how the greyish hide appears black when in shadow and white in full sunlight. This individual was standing in and actually *chewing* the mud when the photograph was taken.

It will be noted that in the above account no reference has been made to *colour* as a distinguishing mark of the white rhinoceros. Structural details only have been touched upon, and these are of course always the most important. As a matter of fact, however, colour plays but little part in differentiating between the so-called "white" and "black" rhinoceroses, since both are of a dull slaty grey. Several explanations of the Boer name "witte rhenoster" (white rhinoceros) may here be considered.

1. The usual explanation is that the first individuals encountered were seen when emerging from their mudbath, and that their caked hides gave them a whitish appearance.

2. A little observation, even in a zoological garden, will amply show that the colour even of a dark animal may vary in intensity, according to the amount of sunlight concentrated upon it. It is now so common for the up-to-date sportsman to be armed with camera as well as with rifle, that most recent works on African hunting are ornamented with excellent engravings from photographs taken on the veldt. Several recently-published photos show that even the *black* species in full sunlight may appear quite white: and Drummond, in the proceedings of the Zoological Society for 1876, has pointed out that the sun shining full on a bull of the white species may

cause it to appear whitish, the same animal on being followed into the shade appearing quite dark. We may thus conclude that *R. simus*, even when not recently emerged from its mud-bath, may appear white owing to the slate-grey hide glistening beneath the fierce rays of the African sun.

3. There appears to be a distinct tendency to true albinism in the white rhinoceros. Individuals have been met which were really white, or at least whitish. Sir Cornwallis Harris, who saw many *simus* during his famous expedition of 1836-7, says of this animal—"His true complexion . . . . . often approaches to cream colour." Mr. Nicholson, writing to the "Field" in 1894, mentions having shot no less than three examples which were of a yellowish cream hue. According to old tradition, the white rhinoceroses inhabiting South Western Cape Colony were lighter in colour than those found further north: these would naturally be the first individuals encountered by the early expeditions setting out from Cape Town, and thus the name adopted by the old pioneers would come into general use.

4. Another explanation has also been suggested.

The horns of the white rhinoceros are pale-coloured, and those of the black rhinoceros are black, hence since these structures are but agglutinated hair, it may be inferred that if these animals'

bodies were hirsute instead of naked, then would *R. simus* be truly white, and *R. bicornis* truly black. Any person who has examined a front horn of the white rhinoceros will admit that the pale bristles sprouting from the base of the horn are themselves half way in structure to hair. Further, I have recently examined a front horn of the allied extinct *Rhinoceros antiquitatis*, and this strikingly resembled a white rhinoceros horn in my possession. Both specimens were markedly fibrous in texture, translucent, and had the posterior margin sharply defined. At its base the fossil horn was split up into bristly fibres, just like that of the white rhinoceros of the present day : in section it showed also exactly the hue which is seen in its living congener, so that the horns of the two species agreed remarkably in many ways. We are thus led up to a most interesting speculation : for since Pallas[1] described the frozen carcase of the woolly rhinoceros which was found in December, 1771, on the banks of the Viloui River, as covered with ash-coloured hair, one may retrace the steps of evolution and fancifully picture the living white rhinoceros of recent times clad in a furry robe of silvery grey. Truly, in such a case, would the white rhinoceros well deserve its name!

Although first scientifically described in 1817, *Rhinoceros simus* had been dimly known to Euro-

1 Pallas : Commentarii Academiae Petersburgicae.

peans for many years previous to that date, though it was not then recognised as distinct from the black species. Thus we find that Dr. Parsons in 1742-3 figured a rhinoceros horn, which Dr. Gray recognised in 1867 as that of *R. oswellii*—kabaoba form of the white rhinoceros. This horn was originally in Sir Hans Sloane's collection, and along with his other curios was purchased by the Trustees on the foundation of the British Museum in 1753: it appears to be the oldest example of which there is any record, and should, therefore, strictly speaking, be regarded as the type specimen rather than any of Burchell's trophies in the Royal College of Surgeons' Museum. It is, however, so remarkably curved in an S-shape as to be practically deformed (kabaoba type run mad), and is quite different from any other horn—whether kabaoba or mohohu—which I have ever seen. On rising from the base, this horn passes first backward, then gradually sweeps forward to become slightly recurved at the tip. Its contour thus resembles that of a reversed gazelle horn of gigantic size. Science can be little benefited by accepting such very abnormal examples as typical of the species, and to do so would be to worship the fetish of priority at the expense of reason.

In 1812 Dr. Burchell found the white rhinoceros abundant in the Batlapin country, near Letakoo (Kuruman), the species being first met with in 26°

S. latitude. Science is indebted to Burchell for the first definite account of *Rhinoceros simus:* a short description of the animal, which he communicated to de Blainville, appeared in the "Journal de Physique" for August, 1817. The Royal College of Surgeons' Museum still contains an interesting memento of Burchell's expedition in the shape of a pair of *simus* horns, the anterior of which measures twenty inches.

Subsequent investigations have demonstrated that the white rhinoceros was once widely distributed over South Africa, wherever the grasslands were adapted to its habits, extending from the Orange River in the south as far north as the Zambesi. We may conveniently take 1812 as representing the era of prosperity, the open veldt then being dotted with peaceful groups of white rhinoceroses—father, mother, and calf—or with solitary individuals standing motionless, awake but stupid, in soulless meditation. We can readily picture the daily life of these animals as narrated in many volumes of sport and travel: the wallowing in the mud-bath, the noon-tide siesta, the grazing over the vast pasturages, the drinking at the lonely fountain: while during the whole bovine round of sleeping and wallowing, of eating and drinking, these colossi were continually attended by their winged sentinels, the faithful rhinoceros birds *(Buphaga*

*africana)*, ever alert to give their dull-witted hosts notice of approaching danger by their shrill cries, or by thrusting their beaks into their ears. Such a picture of wild life is now seldom to be witnessed in Southern Africa, owing to the ruin which has overtaken the white rhinoceros nation throughout all the vast grass-lands from the Orange River to the Zambesi.

The first definite sign of the decadence of *Rhinoceros simus* which appears on studying the history of the species, is a circumstance related by Sir Andrew Smith. He tells us that when his expedition of 1836 passed into Bechuanaland, the white rhinoceros had already receded further north, owing to continual persecution, and was not found within a hundred miles of Letakoo, where Burchell had met with it in abundance in 1812. For many years afterwards, however, the animal continued plentiful in the far interior. Harris found it extremely abundant in the Cashan mountains (Magaliesberg), the future environs of Pretoria being in 1836 and for long afterwards a vast natural zoological park, replete with great game. Cumming, Andersson, Oswell, and others have left behind records showing that in the middle of the last century *simus* was still plentiful. Several causes, however, were fast contributing to its downfall. In 1850 the north-trekking Boers began systematically to exterminate the splendid

fauna of South Africa, the persecution being continued in season and out of season, without intermission. Giraffe, elephant, buffalo, eland, hartebeest, and a host of other noble forms diminished rapidly under their attacks, and the Boers were aided by a multitude of native gunners which the advance of civilisation had provided with more or less reliable firearms.

Prominent in the host of vanishing creatures stood the great white rhinoceros, whose immense size promised a corresponding amount of meat—and at certain seasons an abundance of fat also—to his destroyers. The very harmlessness of the unfortunate colossus was but an added incitement to the destruction of so meek a quarry. "He was just the very thing for young gunners to try their 'prentice hand on," said Oswell. These considerations eventually compassed the death of almost every white rhinoceros south of the Zambesi, and so rapidly was the animal shot out, that like the true quagga, the American bison and the northern sea-cow, it had practically vanished before it was even recognised as rare. In 1880 hunters began to notice the great scarcity of *Rhinoceros simus:* it was hardly to be found even by the most diligent search over the very plains once so abundantly enlivened by its burly presence. Scientific naturalists abruptly realised that it had all but vanished from Southern Africa. The

individual shot in 1882 (its head is now in the Cape Town Museum), was for a long time considered to be the last of its race. Since then a few survivors—*rari nantes in gurgite vasto*—have been recorded south of the Zambesi. The following is the scanty list of the appearances of *R. simus* since 1890 :—

1892. Messrs. Eyre and Coryndon, in August, 1892, saw a bull, cow and calf all together : the next day they met a large cow, a half-grown individual, and a calf. The calf died in captivity after a few days.

1893. Two adult bulls were shot in July, in Mashonaland, by Mr. R. C. Coryndon.

1894. Six animals were killed in Zululand by the late Mr. C. R. Varndell and a friend.

1895. A fine bull was shot by Mr. Eyre in North Mashonaland.

1897. The spoor of a bull and a cow were seen in Matawamba by Mr. F. V. Kirby.

1903. Dr. Gunning, of the Pretoria Museum and Zoological Gardens, kindly informs me that four individuals still linger near Lake Ngami : there were eleven before the outbreak of the war in 1899, four in Zululand, and seven near Ngami. These complete the list.[1]

[1] According to a more recent estimate, there are, however, about ten white rhinoceroses still in Zululand. In December, 1902, an old bull and a younger one "escaped" into a native reservation, where they were promptly killed with spears. (See *Field* for March 21, 1903).

Thus has the great white rhinoceros practically vanished from South Africa, where once it occurred in a teeming abundance difficult to realise at the present day. One cannot expect that the few survivors (now protected as far as possible) will restore the race, though the belated game regulations are no dead letter. In 1897-8 two Europeans who had killed a pair of *simus* (the female being in calf) were very properly compelled to pay a heavy fine.[1] Such stringent measures at an earlier date might have saved to future generations of South African naturalists—and under proper restrictions, of sportsmen also—this curious behemoth, whose monstrous size and antediluvian appearance constitute it a worthy ally of the hornless amynodon and the huge elasmotherium of Miocene and Pleistocene times.

In captivity the white rhinoceros has proved a most disappointing animal, dying even when taken quite young from no obvious cause. None of the calves which have been captured from time to time have survived long enough to be taken down country, to say nothing of being brought to Europe, so that the animal has never been represented in any zoological garden. This has not been for want of trying, for many efforts have been made to rear young *simus*. Many years ago the thirteenth Earl of Derby sent a thoroughly com-

[1] The animals thus wantonly slaughtered were left lying where they fell.

petent man to obtain the white rhinoceros alive, but although he succeeded in taking several calves, not one lived long, and the costly expedition subsequently fitted out by Mr. Nicholson, of Cape Colony, for this express purpose, was equally unsuccessful, although as many as nine young animals were taken. Probably the last attempt that will ever be made in South Africa was that of Messrs. Eyre and Coryndon, who captured a calf in 1892. This youngster was vigorous and sturdy, and indeed inconveniently so—since it was only taken with considerable difficulty—yet though eating well and provided with water, the little rhinoceros died on the eighth day after capture. It is interesting to remember that there are some animals which do not thrive in captivity from some unknown cause, such as the great kudu for example: nevertheless other rhinoceroses as a rule do very well in captivity. The black *R. bicornis* brought into Cassala (purchased in 1868 by the Zoological Society of London) did not die till 1891, when it succumbed to cancer and not to old age, whilst an Indian rhinoceros lived in the Gardens from 1843 till 1849, and another example —also Indian—was purchased in 1850, and died in 1874. Specimens of the white rhinoceros are unfortunately very rare in museums. so that the following census may be interesting. The specimens are as follows:—

1. A calf obtained in 1836 by Sir Andrew Smith's expedition. This animal was mounted by the celebrated taxidermist, Jules Verreaux, under Sir Andrew's personal superintendence, and added to the South African Museum at Capetown. Subsequently it was either sold to or received in exchange by the British Museum trustees, as the animal figures in the British Museum Catalogue of 1843. This specimen is now at the Natural History Museum, South Kensington. Dr. Gray called it a "half-grown calf." It appears to be about three years old. The anterior horn measures 3¾ inches, the posterior one inch. As mounted, the animal's hide is dull black, paling to brownish black beneath. The existence of this specimen is emphasised, as in the various articles which have been from time to time written on ***R. simus***, it has almost invariably been overlooked. This is *not* the animal figured on plate XIX. of Smith's "Illustrations of South African Zoology," as will be seen from the horns and from the measurements given in the book: these belong to an older animal. The young specimen will, however, be found figured under the title of "African Rhinoceros" as fig. 377, in the "Museum of Animated Nature"—the square lip, slit-like nostrils, position of eye, and the semi-tubular ears all being correctly given, whilst the older animal—a fine example—is also depicted as fig. 388 of the same work, under the ambiguous title of "two-horned rhinoceros."

2. A young adult bull, shot by Mr. Coryndon in July, 1893, is now mounted in the Tring Museum. Published measurements—height at shoulder, 6 ft. 9 in. : base of anterior horn to tip of tail, 16 ft. : anterior horn. 1 ft. 11 in. : posterior horn, 8 in. I am indebted to the Hon. Walter Rothschild, M.P., for permission to photograph this specimen.

2A. The skeleton of the above individual was sold to the University of Cambridge for £2,000, and is now in the Cambridge Museum.

3. A young adult bull obtained at the same time as No. 2, is now in the Natural History Museum at South Kensington. Published measurements—height at shoulder, 6 ft. 6 in. : base of horn to top of tail, 14 ft, 6 in. : anterior horn, 1 ft. 7 in. : posterior horn, 7 in.

3A. The skeleton of the preceding animal is now mounted in the Fossil Mammal Gallery of the Natural History Museum.

4. An adult cow *Rhinoceros simus*, obtained many years ago in the interior of Cape Colony, is now in the Leyden Museum. It does not show any tendency whatever to albinism, as some of the Colony *simus* were said to do. The folds of skin on the neck, mentioned by Smith and Harris as occurring in this species, have been reproduced by the taxidermist.

4. Dr. Jentink kindly informs me that the Leyden

Museum has also another adult specimen of the white rhinoceros ; locality unknown.

6. A fine head of this species, obtained many years ago by Mr. Burke for Lord Derby, is now in the Liverpool Museum, where the skull (6A) of the same individual is also preserved. Measurements of horns : anterior 25in., posterior 12in.

7. A young white rhinoceros, taken from a mother of the kabaoba type (so-called *R. oswellii)* on June 3rd, 1862, by Mr. Baines, and by him presented to the Royal College of Surgeons, is still in the Museum of that institution. It is about six inches long ; although only labelled " Rhinoceros " —the rarity and value of the specimen being apparently unknown to the authorities—it is unmistakeably ***R. simus***, the characteristic square lip being well defined, whilst the slit-like nostrils and elongated head are also clearly recognisable. The site of the anterior horn is only indicated by a very slight greyish, flat-topped elevation, hardly differentiated from the rest of the head : in the middle of this elevation are seen two small parallel areas of a purplish-brown tint, apparently indicating nuclei of horny material. There is no sign whatever of a posterior horn, nor of any hair or pigment. *It is probably the only spirit specimen of Rhinoceros simus in any Museum.*

8. The South African Museum, Cape Town, possesses the head of the bull shot in Mashonaland

by Mr. Selous in 1882, and then supposed to be the last of its race. It was brought to England to be mounted, and was exhibited at a meeting of the Zoological Society in 1886, before being sent back to Africa. The skull of the same individual (8A) is also in the South African Museum.

9. The fine bull white rhinoceros, shot by Mr. Eyre in Mashonaland in 1895, was purchased by Mr. Rhodes, who presented it to the Cape Town Museum, where it is now mounted. The skeleton (9A) of this same animal is also in the Museum.

10. The specimen shot in 1894 by the late Mr. C. R. Varndell was sent to London to be mounted. It was subsequently purchased by Mr. Carl Jeppe, who presented it to the Pretoria Museum, where it still remains. It is said to have a good anterior horn 3 ft. long.

11. A fine skeleton of a cow *Rhinoceros simus* is now exhibited in the new Gallery of Comparative Anatomy, at the Jardin des Plantes, Paris. It was obtained from the Cape, and the label bears the inscription "Ed. Verreaux, 1846."[1]

In addition to the foregoing, there are various other odd specimens of skulls and horns in various

[1] There does not appear to be any stuffed specimen corresponding to this skeleton in the Jardin des Plantes collection. The rhinoceros with long forehorn sweeping backwards which the casual visitor sees mounted in the stuffed series is not *Rhinoceros simus* but a very fine specimen of the Indian species. This individual lived in the menagerie of Versailles and was dissected in 1793 by Vicq d'Azyr and Mertrud.

museums, many being without any history attached. Of these the finest skull appears to be that of the aged individual brought home by Gordon Cumming, and now in the Royal College of Surgeons' Museum. The record anterior horn (62½ inches) was also obtained by Cumming, and is now in the possession of his relative, Col. W. Gordon Cumming. Some interest attaches to the series of *simus* horns in the National Collection, which includes Sir H. Sloane's kabaoba specimen already referred to, and also the pair of kabaoba trophies on which the so-called *R. oswellii* was founded. The latter are of course remarkable for the forward inclination of the anterior horn, and were obtained by Andersson. He presented them to Col. T. Steele, who gave them to the British Museum previous to 1843. They are figured in Andersson's "Lake Ngami"; the front horn measures 31 inches, and the posterior one 11 inches. The student will find a very fine anterior horn of the mohohu type displayed in the Index Collection of the Natural History Museum.

Finally, I may mention my own specimen, brought home a year or two back from South Africa by Mr. Penfold, an engineer working on the railway near Buluwayo. It is an anterior horn of the mohohu type, said to have been picked up amongst the sedges of a river. One may reasonably conclude that it had dropped out of some

hunter's waggon in fording the stream, and that it was obtained much further up country than the locality where it was found. In spite of its history, the horn is in good preservation, and but little defaced, though the base has apparently been gnawed by rats. It is longer than the anterior horns borne by the mounted specimens either at Tring or South Kensington, taping exactly 2 feet; the circumference at the base is 17½ inches.[1]

A few years ago this census would have practically completed our knowledge of the white rhinoceros, which would have been regarded as a well-nigh lost species, being almost exterminated south of the Zambesi, and utterly unknown north of that river. But an astonishing sequel remains.

The white rhinoceros, harassed out of existence throughout *South* Africa, has been re-discovered further north. It has risen, phœnix-like, from its ashes; the naturalist need no longer mourn it as an extinct animal!

1 It would be interesting to know if the white rhinoceros head brought to England by the Rev. John Campbell, about 1815, is still in existence. It appears to have been preserved as late as 1867 in the Museum of the London Missionary Society at Finsbury, but there seems to be no mention of it during recent years in zoological literature. In a figure now before me the artist has absurdly furnished the open jaws with an imaginary series of perfectly regular pseudo-molar teeth: the square mouth has been distorted to resemble the prehensile lip of the black species, though the slit-like nostrils, position of eye and semi-tubular ears are delineated with fair correctness. The anterior horn of this individual is said to have been 3 ft. long: and, *as figured*, from its slenderness recalls Col. Hamilton Smith's description of the mysterious horn, brought from Africa, from which he sought to deduce the existence of a true unicorn in the interior of that Continent.

The skull and horns of an undoubted white rhinoceros, shot by Major Gibbons at Lado, on the Upper Nile, were exhibited at a meeting of the Zoological Society, held on December 18th, 1900. Other corroborative evidence, were it needed, is also forthcoming, showing incontestably that *Rhinoceros simus* yet wanders over a considerable portion of the African continent. Dr. Gregory, in his work on the Great Rift Valley, mentions having seen in Leikipia three rhinoceroses, which he believed to be of this species, though unfortunately none of the three were obtained: Sir H. H. Johnston, in his work on British Central Africa, states that a pair of horns, resembling those of the white rhinoceros, and obtained near the Ruo River, were sent home in 1895. The anterior horn was very long, slender, and directed forwards (kabaoba?).[1] A number of long slender horns were sent some years ago by the late Mr. F. Holmwood and assigned to a hypothetical *Rhinoceros holmwoodi*. They have not only been supposed to indicate a species allied to the white rhinoceros but the *holmwoodi* horn now exhibited in the mammal gallery of the Natural History Museum certainly recalls the

1 The forward inclination of the anterior horn is not however confined to the white rhinoceros. The example of the *black* species in the Berlin Zoological Gardens has the front horn pointing forwards at an angle of 45°. On the other hand the black rhinoceros which died in London in 1891 had the anterior horn vertical; one thus has "mohohu" and "kabaoba" forms in *both* species.

long anterior horn of the veritable *simus* figured in Campbell's Travels.

Attempts have been made to associate *R. holmwoodi* with the *black* rhinoceros, but they seem to have been initiated prior to Major Gibbons' discovery in 1900, before which date *simus* was unknown in East and North East Africa. Mr. Rowland Ward, writing to the "Field," on November 17th, 1894, stated that he had seen a horn of the white rhinoceros which had been brought from what is now British East African territory, and many miles from any known haunt of the species; Count Teleki mentions a white rhinoceros amongst the animals shot by his party during his Lake Rudolph expedition of 1887-88. Although this constitutes a considerable mass of evidence, it is by no means all, for on examining the records of the past, one finds many obscure hints of the presence of this species *north of the Zambesi*. Strange to say, these records appear to have been utterly ignored by naturalists, though they have long been published to the world; the facts are here restated as follows:

1. The earliest evidence of the existence of *R. simus* north of the Zambesi is probably that of Mr. Salt, the Abyssinian traveller, who on his return in 1811 presented a trophy (consisting of anterior and posterior horns) to the Royal College

of Surgeons' Museum. These horns are almost certainly those of the white rhinoceros.[1] In the absence of any data, however, they cannot be absolutely proved to have come from the countries through which Mr. Salt travelled, though the presumption that such is the case is strong indeed. Locality and not identity is here the debateable point ; as confirmatory of other evidence, we may conveniently insert mention of them here.

2. When Denham and Clapperton returned home from their Central African expedition of 1822-24, they presented to the British Museum two remarkable *light-coloured and semi-transparent horns.* It is interesting to remember that the horns of the white rhinoceros are pale-coloured on section, and that Sir A. Smith (who had practical experience of *R. simus* in Southern Africa) himself suggested that if not those of young *simus*, they must belong to some unknown species of rhinoceros. "The horns of *Rh. simus*," said Sir Andrew, "possess more of the above characters than any others yet known."

3. Speke has stated that his party in 1864 shot several of the "white two-horned rhinoceros" in Karagweh, East Africa, and *expressly* says that

[1] In the Catalogue of the Royal College of Surgeons' Museum, Mr. Salt's trophies are *doubtfully* assigned to the white rhinoceros: however, these interesting specimens agree perfectly with undoubted *simus* horns.

the species killed was *larger* than the black rhinoceros.

4. Stanley claims to have shot *R. simus* in Karagweh.

The above evidence, both recent and remote, thus proves the distribution of the white rhinoceros to be far wider than was formerly supposed. A great portion of the newly-discovered home of *R. simus* lies within the boundaries of a British Protectorate — Uganda. It is therefore to be hoped that this sorely-persecuted species may at last receive efficient protection. Already it is evident that the era of slaughter is passing away from Africa, and that preservation and not persecution will be the order of the day. The most recent accounts of the various game reserves established by British Administrators show that much may yet be done to protect the noblest fauna the world has ever seen ; and the naturalist, on reading the reports of the increasing zebra and waterbuck herds on the Shiré River, and of the flourishing state of the protected game animals along the course of the Uganda Railway, may reasonably hope that the persecuted white rhinoceros, so harassed in the past, may find an abiding sanctuary under the ægis of the *pax Britannica*. Protection *vice* persecution, increase *vice* decrease, stringent guardianship *vice* irresponsible indif-

ference, may yet preserve to future generations much of the zoological wonderland of Africa; and that such may be the issue will be the wish of every naturalist, of every traveller, and of every true sportsman.

*Inveniat dies!*

## THE GRÈVY ZEBRA.

The most superficial study of the map of Africa to-day demonstrates everywhere the rapid progress of civilisation in every part of what can scarcely any longer be called the Dark Continent. Northwards, Egypt, prosperous and contented, is happily united to a reconquered Soudan, and Khartoum (linked to Cairo by a band of iron) is once more an outpost of civilisation. Westwards lies the huge area of British Nigeria, our latest protectorate. In the East the Uganda Railway, a hissing snake of steel, writhes its way from Mombasa on the coast to Port Florence on the Victoria Nyanza: while far in the south Table Mountain, once infested by lions and rhinoceroses, towers above the metropolis of a vast austral empire stretching from the Cape to the Limpopo.

Although the railways have in recent times proved most important factors in this opening up of Africa, one must not lose sight of the invaluable services which have been and still are rendered to man by his fourfooted servants,—especially by the horse for riding and by the ox for transport. Numerous accounts of African travel have made us familiar with the hunter's equipage—a waggon drawn by a team of sturdy long-horned Cape oxen, encouraged by the voice

GRÊVY'S ZEBRA.

Formerly the property of President Faure. Its docility is aptly indicated by the headstall.
The white animal in the next pen is believed to be the only fertile mule known.

and whip of some leather-lunged Kaffir. The progress of exploration and trade would have been seriously hampered without such valuable auxiliaries. Unfortunately, travellers are still hindered by two most serious scourges—the veldt-sickness, which attacks "unsalted" horses, and the progressive emaciation caused in oxen by the bite of the tse-tse fly.[1] These twin plagues, which have cost African travellers many thousands of pounds, are not yet fully understood, but it may be interesting to briefly consider them in this place.

The horse-sickness is a non-contagious fever of malarial type, produced in annual epidemics by a minute fungus which grows on the veldt during the African summer. Owing to its moisture-loving nature, this curse is especially potent in damp places and at night: it attacks grass-fed horses with great virulence, over 95 % of the affected animals succumbing. The equine patient stands with running nose and eyes and lowered head, his heaving flanks telling too plainly of the impeded respiration and the rapidly-developing pleuro-pneumonia which will probably carry him off in a few hours: those horses which survive, however, are immune from further attack. Attempts have been made to investigate the hypothetical germ which produces the illness, but with uncertain

[1] The student will recollect the dismal fate of the early Portuguese expeditions of the sixteenth and seventeenth centuries, which were often ruined by the tse-tse killing all their horses.

results, though genuine horse-sickness blood has been found to contain certain bodies, both inside and outside the blood corpuscles. Little is known as to their true nature, but it appears that neither forms can be readily stained with the aniline dyes usually employed in microscopic examinations, and that the extra corpuscular bodies exhibit great variations in size. Hitherto the only chance of recovery has been afforded by the rough and ready treatment of bleeding the equine patient to exhaustion: Oswell tells us that he succeeded in saving one or two horses by this risky method.[1]

The tse-tse fly (*Glossina morsitans*) was originally brought to the notice of Europeans by Oswell and Vardon, who met with it on the Siloquana hills near the Limpopo; the first specimens brought to England being those caught by Vardon on his favourite horse. Many specimens have since been received in this country, and may be seen in the principal museums. The tse-tse is about the size of a house-fly, and is greyish-brown in colour, the abdomen being gaily striped with yellow. This insect is thus very much smaller than the absurdly-exaggerated figures of it in books would lead one to suppose: it is misleading to compare the tse-tse to a bee in size, as is often

1 The late Roualeyn Gordon Cumming once *prevented* his horses from taking this distemper by preventing them from eating grass, and by covering them at night with blankets—the former precaution alone would probably have been sufficient.

done. The tse-tse has only two wings, the posterior pair being represented, as in the common housefly, by rudiments or "balancers." As if to compensate for the loss of the hind wings, the anterior pair are long and well developed, projecting, when closed, considerably beyond the end of the body. The tse-tse has a characteristic buzz, probably produced by the rapid vibration of the balancers; the chief interest attaching to this terrible insect, however, centres in its proboscis, which consists of a hollow stylet, protected by an adpressed palpus, on each side, and furnished at its base with a bulbous expansion. The tse-tse thrusts the central stylet into the skin of the victim, sucking up the blood like an ordinary mosquito in England. Although happily innocuous to man, the stab of this winged terror is fatal to nearly all domesticated animals.[1] The victim in a few days begins to sicken: then, with running eyes and nostrils and staring coat, the unfortunate animal rapidly goes down hill, struggling about in a state of emaciation for a few weeks—three months at most—and eventually dying exhausted. The blood for a short time before death is found

1 It was formerly thought that the bulb situated at the root of the proboscis was a poison gland: such, however, is not the case, the tse-tse being harmless in itself. Frequently, however, minute parasites, derived from a previous host, adhere to the proboscis of the tse-tse: these are introduced accidentally when the fly begins to suck its next subject. If this second host be susceptible, the parasites, which rapidly multiply in the blood by longitudinal division, soon kill it.

to be swarming with microscopic parasites of the genus *Trypanosoma*, and after death the heart and lungs are markedly anæmic. Wild animals—Burchell zebra, sable antelope, and so forth—are not liable to this terrible malady: an infusion of zebra blood, however, is not sufficient to save the victim, judging from the loss of some zebra-horse hybrids which were experimentally inoculated in 1898, and died eight weeks afterwards.[1] Strange to say, although adult oxen readily succumb to the disease, the sucking calf is immune from the poison.

In consideration of the enormous pecuniary loss sustained every year from these two plagues, it is evident that an inestimable benefit would be conferred on civilisation if some animal could be found capable of acting as an efficient substitute for horse or ox, and of course immune from either disease. The common donkey is only partially liable to the tse-tse poison, and has been frequently employed: but on account of its inferior size and self-willed disposition, this animal cannot be considered as an effective substitute for either horse or ox. A very interesting series of experiments was made in the Transvaal during 1893, when eight wild-caught Burchell zebras (*Equus burchellii*) were trained to run in mail

[1] See Proceedings of the Fourth International Congress of Zoology: Cambridge, 1898.

coaches between Pretoria and Pietersburg, and—contrary to the received opinion regarding these animals—proved themselves to be most willing and docile steeds, neither kicking nor biting when once broken in. The success of this effort caused more zebras to be purchased: but as the experiments continued, it became evident that though willing enough, they were not sufficiently strong for continuous work, and the matter was abandoned.[1] Burchell's zebra stands about twelve hands high at the withers, having the make and proportions of a stout pony: one cannot, however, expect wild-caught animals, even of this size, to be equal to such heavy and continued work as is implied in the daily to and fro journeyings of a mail-coach. There remains, however, a splendid and little-known zebra, whose powerful frame might well be employed in the service of man. This species is a native of Shoa, Somaliland, and British East Africa north of the Tana River: it is known as Grèvy's zebra.

Grèvy's zebra (*Equus grevyi*) is a magnificent creature, with the handsome form and ample proportions of a horse. The head, although terminating in an elongated face and surmounted by large wide ears, is extremely beautiful in its outlines, which suggest those of an antelope

1 The domestication of Burchell's zebra has now been recommenced in *East* Africa.

rather than those of a zebra. The hoofs are rounded in front, long-heeled behind: the neck is adorned with an erect mane, and the tail resembles that of a donkey. In its actions Grèvy's zebra resembles a horse, but its voice is asinine rather than equine. The ground colour of the animal is a beautiful silvery white, elegantly banded at regular intervals with narrow black stripes, which rise from a line running along the back, and extend over the sides, stopping short of the abdomen. The muzzle of Grèvy's zebra is bright bay; there is frequently, but not always, a white area on the croup, disposed on each side of the middle line, while the tail tassel is invariably white. The legs are striped, sable and silver, right down to the hoofs.

Although not known to scientific zoologists until 1882, it is highly probable that *Equus grevyi* was the zebra or *hippotigris* of the Romans, and that it was the animal exhibited in the arena under that name. Of these early appearances, we may note that in the reign of Caracalla (244-217 A.D.) three zebras were slaughtered in the arena, and that Philip the Arabian subsequently possessed no less than twenty examples of the "hippotigris," which he exhibited to the populace: while Dion Cassius tells us that Severus received from Plautianus the "tiger-like" horses of the Sun (τιγροειδες), which were found on an island in the

Red Sea. Although the epithet "tiger-like" may refer to the supposed ferocity of the animals, it is at least equally probable that it indicates that they were conspicuously *striped*, and hence really zebras—not merely wild asses, as some might be disposed to think, seeing that even wild asses can bite and kick savagely. The Arabs were long ago acquainted with some equine animal which they called Zeora or Zecora, and this creature has been supposed by some to have been the true or mountain zebra (*Equus zebra*), a most absurd conjecture. Ludolph, in his "New History of Ethiopia" (published 1684), tells us that "there is a beast which is called Zecora which for beauty excels all the fourfooted creatures in the world. They of Congo give it the name of Zebra. This creature is about the bigness of a mule, and is brought out of the woods of Habessinia. . . . . and easily tamed—a present of great esteem and frequently given to the kings of Habessinia. . . . His Eares are the only thing that disfigures him, being of a disproportionate length, for which reason he is call'd by the Portugals Burro do Matto (though improperly), the wild Ass."

In 1809-10 Mr. Salt travelled in Abyssinia, and came within an ace of making a grand zoological discovery, for he also alludes to the "Zebra or Zecora," which occurred chiefly in the south of that country. He states that its mane was in

great demand as a collar for the war horses of the chiefs on state days.[1] In reviewing the evidence of Ludolph and Salt, it must be plain to anyone that the Zecora of the Arabs was identical with Grèvy's zebra, and not with the mountain zebra, which is quite a distinct animal, unknown north of the Equator.

In spite, however, of these vague hints and brief accounts of the existence of the Zecora, this magnificent beast remained unknown to scientific Europe till 1882, when a specimen was sent alive to France by Menelek (then King of Shoa) as a gift to the President of the Republic. On arriving in Paris, the new animal was placed in the menagerie of the Jardin des Plantes, where it was at once recognised as new by the late M. Alphonse Milne Edwards, who gave it the name of *Equus grevyi*. The zebra was sent to Europe in the warmest part of the year, but soon died of inflammation of the lungs, though not before its appearance in life had been recorded by the camera. Unfortunately, the animal having been photographed with its muzzle in a bucket, the characteristic elongation of the face was not shown in the print. The dead zebra was stuffed for exhibition in the Gallery of the Natural History Museum, in the Jardin des Plantes:

1 The Angoni tribesmen of British Central Africa are said to employ the mane of *Burchell's* zebra as a head-dress when on the war path.

great pains were taken in mounting it, the body being carefully measured, while plaster casts were taken of the face, shoulders, pelvis, and feet. All the bones were retained as a foundation for the stuffed skin, except the skull, which is now in the Museum of Comparative Anatomy. A figure of the new zebra appeared in several scientific publications, and caused a considerable amount of discussion: for while some naturalists followed Milne Edwards in considering it a distinct species, others asserted that it was nothing more than a large variety of the mountain zebra, a theory to which its asinine head and ears and peculiar striping at first lent some colour. The setting up of the Paris specimen was also subjected to adverse criticism, the great length of the face as represented in the dried skin not being then recognised as a normal condition.

The judgment of M. Milne Edwards was, however, triumphantly vindicated by the subsequent arrival in Europe of a considerable number of zebra hides, all of which were alike, and resembled the type specimen in the Jardin des Plantes Museum, so that *Equus grevyi* was definitely established as a true species. A second living specimen—a young mare—reached Paris in September, 1898, being a present from the Emperor Menelik to President Faure, who gave the animal to the Jardin d'Acclimatation. When she was duly

placed in a pen, next to some of the better known Burchell zebras, the comparison was much to their disadvantage, for though they were handsome enough after their kind, the Burchells appeared but as clumsy ponies when contrasted with this tall and elegant creature, whilst the mountain zebra of the Cape seemed little better than a striped jackass. Many of the stripes of this second *grevyi* showed the brownish tinge due to youth. President Faure's pet was very tame, allowing me to stroke her sleek sides like any horse, and was quite a favourite with the Parisians. This animal is now dead, and may be seen stuffed at the Jardin d'Acclimatation.

In 1899 the Emperor Menelik again sent *Equus grevyi* to Europe: this time a pair of animals as a present to Queen Victoria. They were believed to be the only survivors of a herd of twenty, which had been captured and brought to Addis Abbeba. The zebras performed in safety the long six weeks' march from Addis Abbeba to the seaport of Zeila, and after being rested were shipped for England, which they reached without mishap. The male was an old animal, being believed to be about twenty years of age: he died suddenly after a few months in England, but the female is still living in the London Zoo, and her portrait will be found in this book. She resembles the Paris specimen in the gentleness of her de-

GRÈVY'S ZEBRA.

A five-year-old mare presented to Queen Victoria by Menelek, Emperor of Abyssinia, in 1899.
Note the elongated head and ears, the narrow striping, and the white space over the croup.

meanour, which contrasts favourably with the surly viciousness of the mountain zebra in the next pen. It is hoped that a mate may eventually be obtained for this animal :[1] indeed it appears reasonable to hope that Grèvy's zebra may some day breed as regularly in European Zoos as any of its congeners —the other zebras—have done in the past. The large size, handsome appearance, and gentle disposition of *Equus grevyi* constitute it a most desirable addition to any menagerie, whilst its great strength encourages the hope that as a domesticated animal it may prove a most valuable auxiliary.[2]

Although previously noticed by Speke and Grant in the mountains north of the Victoria Nyanza, Grèvy's zebra (definitely recognised as such) was not found in the wild state by Europeans till 1893, when it was met with near Durhi, in the Malingur country : and some small amount of information regarding its habits in the wild state is now available. *Equus grevyi* has been ascertained to go in much smaller herds than Burchell's zebra—from ten to twenty of the former, as compared with perhaps one or two hundred of the latter, being a frequent proportion : mixed herds of the two

1 Owing to additions to the menagerie since the above was written, there were in June, 1903, no less than four of these magnificent zebras living in the London Zoological Gardens, one of these being a male. Unfortunately this beast died on March 20, 1904.

2 I understand that two of these fine zebras now in the Zoo have recently been broken in for riding purposes.

species occur where the distribution of the animals overlaps. Grèvy's zebra, like its congener, is fond of rolling in the dust, as may be observed in menagerie specimens: it resembles *burchellii* also in drinking every day, in frequently associating with other game—such as oryx antelope—and in being much persecuted by lions. Travellers have reported that the nature of the country inhabited by Grèvy's zebra frequently consists of rocky plateaux, intersected by deep ravines (thus resembling the haunts of the mountain zebra of the Cape): their accounts are confirmed by the recently-published photographs by Lord Delamere, which represent *E. grevyi* in its native home. One of these pictures a troop of about a dozen individuals standing knee-deep in the long grass of an African valley, whilst behind them stretches a dense mass of stunted bushes, and behind these again are seen the outlines of bare, stony hills, dotted here and there with sparse vegetation, and vividly reminding one of the desolate hills which fringe the Northern Sahara. Another very interesting sun-picture shows a large herd of these zebras, together with a number of oryx antelopes, standing motionless, basking in the hot sunshine after drinking at a water-hole. The ground consists apparently of scrub-covered plain, with alternating patches of

MOUNTAIN ZEBRA

Of Cape Colony. Note the asinine ears, mane, and tail, the broad stripes, and the "gridiron" marking over the croup. This individual was born in Amsterdam.

absolutely parched earth. A very curious point is well illustrated in this photograph.

It might reasonably be supposed that so boldly striped an animal as a zebra would be conspicuous enough even at a distance, but this proves not to be the case, and indeed it has been recorded of all three species that in the wild state their markings render them *practically invisible*. Thus Sir John Barrow, writing in 1801 of the mountain zebra, says, "the black and buff zebra even when very near it and especially if in motion appears of a dull bluish ash colour like the common ass." The photograph of zebra and oryx above alluded to gives an excellent idea of how in *Grèvy's* zebra also the striping merges into the ground colour, the animal when viewed from a distance appearing of a uniform dun hue. Burchell's zebra is similarly inconspicuous when seen a long way off: experiments made by me in August, 1902, on a pair of tame individuals turned out to grass demonstrated that the stripes of *Equus burchellii* begin to blend with the ground colour at a paced distance of 150 yards.

Having thus considered the history and habits of Grèvy's zebra one may now discuss the future of the animal: indeed in the future lies the main interest of any study of this species. The past indicates it as a striking figure in the semi-legendary tales of ancient and mediæval

times, when it was supposed to be a hybrid between a horse and a tiger. At the present day it is to be regarded as a rare and beautiful form—perhaps, indeed, the *most* beautiful of all wild animals—so that it is of interest to the naturalist. But its true importance lies in the possibility that its great strength and gentle disposition may one day prove useful to man; and that it may eventually play an important part in the opening up of Africa, especially in its own native haunts, where the need of an efficient transport animal is so great. In Grèvy's zebra one sees an opportunity of applying the study of natural history to a very practical use: for it seems likely that by crossing this animal with the horse or ass there might be bred a race of giant mules, which would even exceed in height the enormous measurement of 22 hands (7 ft. 4 in.) at the withers, already recorded of the ordinary horse-donkey hybrids. Needless to add, these strong "zebrules" would be able to carry proportionately heavier burdens than the ordinary mules, and would in the long run prove cheaper than they, since a supply of wild zebras could be captured from time to time as required.[1]

[1] A zebra farm has already been established at Nairobi on the Uganda Railway for the domestication of *Burchell's* species, and there is a similar institution in German East Africa.. Great numbers of these animals have been trained by the German Government. It is intended to ship to Europe a large consignment of sixty zebras during 1904.

EQUINE HYBRID (in the Jardin des Plantes).

(Asiatic Wild Ass × Burchell Zebra.)

On the hind quarters are seen broad bands derived directly from the zebra parent; the body shows narrower striping probably inherited from a remote ancestor. General body colour rufous grey. The characteristic inquisitiveness of these hybrids is seen in the averted head, the animal being absorbed in the clumsy antics of a young elephant in the next pen.

The whole subject of equine hybrids is extremely interesting, and crosses between many of the species have been obtained. The mountain zebra has bred with the common ass; the Burchell zebra has been crossed with the common ass, with the Asiatic wild ass, and with the horse: the true quagga has bred with the Asiatic wild ass and the horse. The series of hybrids thus obtained is a long one, the records extending from about 1786 to the present day. Most, if not all of the foals born exhibited stripes which resembled those of their zebra parent. Such a result was only to be expected: a most remarkable fact, however, deserves brief mention here. Many, if not all of the young animals exhibited *additional stripes, which did not resemble those of their parent,* but, on the contrary, were long and narrow, *like those of Grèvy's zebra!* This singular phenomenon has been explained as follows:

Naturalists (acting on the supposition that the various species of every genus have been evolved from a common ancestor) have endeavoured to reconstruct this ancestor by intercrossing the various species so that the resulting hybrid may present more or less remotely the original appearance of the progenitor of the race. The peculiar *narrow* striping which occurs frequently in equine hybrids (with or without the presence of other

stripes or bands derived *directly* from the actual zebra parent) therefore indicates that Grèvy's zebra is *an evolutionally older form* than the others, being thus the most primitive type of zebra in Africa, and perhaps that from which all the others are descended. Indeed, at the present day, we see that the mountain zebra of the Cape resembles *grevyi* in its long ears, in its unstriped abdomen, in its legs being banded right down to the hoofs: whilst Burchell's zebra retains in its semi-equine mane and tail a likeness to its northern cousin. These and other matters relating to these very interesting animals require much elucidation, and in the careful investigation of many problems connected with the splendid zebra which we have just been considering, there yet remain years of work for the naturalist.

QUAGGA (in the Leyden Museum).

## THE TRUE QUAGGA.

"Alas! in the colony of the Cape of Storms, how have the wild sports dwindled from their former prosperity . . . . . Before the strides of civilization, together with the rugged aborigines, have receded also the scarcely more savage quadrupeds; and saving certain diminutive antelopes, which will hereafter be noticed as frequenting the sea coast, the springbok now affords the only four-footed game that occurs in any abundance."—*Sir W. Cornwallis Harris* (*1840*).

We have already seen, when considering the white rhinoceros, how the advance of civilization in South Africa resulted in a terrible diminution of the numbers of the indigenous game animals: the eloquent lament of Sir Cornwallis Harris but foreshadowed a greater devastation, which has continued almost to the present day.

Happily at last there are indications that this waste of life is being checked.

In 1899 an International Conference for the preservation of the African game animals was held in London, and delegates representing the various Powers now colonising Africa met to discuss the best methods of procedure: the regulations then drawn up have been published, and may be studied by consulting the Parliamentary papers for 1899. The British Government has declared considerable areas of land in various parts of the continent to be game reserves, and the

animals which inhabit these sanctuaries receive either partial or total protection. Thus the whole of the Soudan lying south of the Sobat and Bahr-el-Ghazal Rivers, together with the greater part of Darfur and Kordofan, has been declared closed for the present—a vast area of some 400,000 square miles being set aside for the benefit of the game. In Uganda the Sugota reserve has been for several years an accomplished fact; in British East Africa the Kenia sanctuary has not only been established, but has since undergone a careful investigation, resulting in a prompt rectifying of several defects, while a large area to the north of Mount Kenia has also been declared closed. In British Central Africa there are the Elephant Marsh reserve (established 1896) and the Lake Shirwa reserve. Even in devastated South Africa it appears that it is not yet too late to save some of the animals: the Sabi sanctuary promises to be of real service, and contains many rare species (such as the southern giraffe),[1] while a refuge for the gemsbok and Cape hartebeest is to be established near Warmbaths.

Eminently satisfactory as this new state of

[1] Measures for the protection of this beast appear to have been taken only just in time: indeed it appears doubtful whether the typical Cape race is not already extinct. The southern giraffes now obtained are said to differ considerably in coloration from the tawny, dark-blotched specimen presented to the National Collection by Lord Derby many years ago. This example was long exhibited to the public in the British Museum, and many persons will well remember it.

things must be to all naturalists, it is sad to reflect that had such steps been taken earlier, far more might have been done. Perhaps it would have been too much to expect the early settlers of 1652-1800 to have prevented the extinction of the blaauwbok; at first, indeed, they seem to have been afraid that the wild beasts would exterminate *them*![1] It seems, however, regrettable that the once abundant white rhinoceros should have been almost utterly exterminated south of the Zambesi during the last fifty years, while the loss of the beautiful true quagga of Cape Colony, the Orange River Colony, and Griqualand West is even more to be deplored, for it seems that with a little protection it could easily have been saved, and might even have become a domestic animal.

The true Quagga (*Equus quagga*) stood about 4 ft. 6 in. high at the withers. In general proportions it resembled a stout pony, and the mane, and tail and hoofs were semi-equine. The body colour was rufous brown, becoming fulvous posteriorly, and fading to white on the abdomen, legs, and tail. The head was of a bay colour, striped with brown, in zebra fashion. The neck was ornamented with broad bands of dark brown, alternating

1 Governor Tulbagh records in his diary that on one occasion it almost seemed as if the lions would take the fort by storm! Hippopotami were common on the present site of Capetown, and the abundant (black) rhinoceroses made hay of the settlers' crops.

with narrower white ones ; these markings began to fade at the withers, but were continued more or less indistinctly as far as the haunches, which bore a few indefinite dark lines and spots. The upstanding mane was banded with brown and white : the tail reached to the hocks, and was pure white without any admixture of brown. The iris was orange brown in Lord Derby's female quagga, as figured from life by Waterhouse Hawkins.

The Quagga was first mentioned by Tachard about the middle of the seventeenth century, under the name of "wilde esel" (wild ass), though the absurd creature he describes, blazing with tints of pyrotechnic brilliance, has little resemblance either to the original or to anything else. Some years later Dr. Allamand published a description received from Col. Gordon of a quagga foal : this account being reprinted by Buffon. Gordon's description was accompanied by a sketch, and to him rightly belongs the credit of introducing the animal to the notice of scientific Europe. Edwards supposed the quagga to be the female of the mountain zebra, but this error was corrected by Dr. Sparrman towards the end of the eighteenth century. The doctor further states, in his book of travels, that the quagga was sometimes kept alive by the colonists to protect their flocks

from the attacks of wild dogs[1] and hyænas, and also mentions the specimen now in the Stockholm Museum. Le Vaillant seems to have seen the animal in the wild state about 1781, though he did not obtain any specimens. In those early days it was remarkably abundant, ranging the spreading plains in vast herds of many hundreds, often mixed with black wildebeest and ostriches.

The quaggas probably grazed stretched out in a great semi-circle, like other wild asses, and it must have been a beautiful sight to see hundreds of these animals spread over the flower-bespangled veldt, their handsome striped heads closely applied to the fresh green grass, and their snowy tails whisking to and fro, while eagles, hawks, and other birds floated above them in the cloudless azure. Harris' famous "Portraits of the Game and Wild Animals of Southern Africa" includes an interesting sketch of several quaggas drawn from life on their native veldt. The nearest animal stands on the edge of a little pool fringed with graceful rushes: close by are three or four others—apparently basking, after drinking, in the early rays

1 The Cape hunting dog *(Lycaon pictus)* is a long-legged, particoloured brute, which hunts in regular packs. These ferocious hounds, formerly preying on antelopes, became the terror of the Cape farmers, whose sheep they would massacre in sheer bloodthirstiness. *If the old stories are true*, the quagga showed a high degree of courage in facing animals able to conquer the lion. Bay horses, however, are noted usually for their spirit: and this tint entered largely into the coloration of the quagga!

of the morning sun. In the middle distance is seen a troop of springbok, the prominent chestnut line ornamenting their flanks being excellently rendered: two of these buck are rejoining the herd after drinking. Further away are seen more quaggas, the main troop being dimly recognisable, spreading out in characteristic crescent formation as its component members begin to graze. A single rocky hill rises in the ocean-like expanse, its outlines swimming in hazy perspective on the boundless horizon.

The quagga like many other animals had the curious habit of swarming at the salt pans to lick the salt. These pans are vast depressions, gleaming with crystallized efflorescence, and curiously recalling the salt lakes of Algeria. Harris has left a clever sketch of one of these saline tracts, the impression of free boundless space and sparkling atmosphere being capitally rendered. In the foreground are seen a couple of small pools, whose moisture encourages a scanty growth of trees and shrubs: a few antelopes are resting near the water or careering over the plain, whose parched condition is well shown by the cloud of dust thrown up by their flying hoofs: the horizon is blurred in the shimmering heat-haze, through which loom indistinctly the grotesque forms of some three or four ostriches. My own picture reproduced in

A SALT LAKE ON THE ROUTE TO THE SAHARA.

this book represents the Chott Tinsilt, a salt lake on the route to the Sahara: seen in the early morning, with the sunlight on its blue waters and the purple mountains behind, it is a sight to be remembered.

The pace of the quagga was said to be fleet, though laboured: wounded animals bit and kicked severely and even inflicted fatal injuries on incautious hunters. According to Sir John Barrow it was often taken alive by lassoing, just as the Boers of to-day take Burchell's zebra with the fangstock or noosed stick.

Extending as far south as the Albany district in Cape Colony, the range of the quagga was limited to the north by the Vaal River, beyond which it was replaced by Burchell's zebra, its faithful comrade the black wildebeest being similarly replaced by the blue wildebeest. The quagga seems to have shown some tendency to variation in the different portions of its habitat, some individuals having the ground colour of the head, neck, and chest chocolate brown, while in others it was chestnut, and portions of the example preserved at Vienna are creamy buff. In 1817 Dr. Burchell presented the skin of a young quagga to the British Museum, and this specimen was thought so remarkable that Hamilton Smith considered it a new species, under the name of "isabella quagga," an error

afterwards corrected by Dr. Gray. Darwin, in his "Origin of Species," mentions a figure of a quagga, in which the legs (usually pure white) were distinctly barred above the hocks. There is, however, very little material left on which to base any conclusions regarding the variations of *Equus quagga*. Careful examination of several museum specimens has, however, convinced me that the mane of the female quagga was longer than that of the male.

During the last ten years it has become the fashion amongst naturalists to describe the quagga as little more than an extreme southern variety of Burchell's zebra. They point out that beyond the Vaal River the quagga was replaced by a subspecies of *burchellii* which in its white legs and abdomen approximated to the half-striped condition of the quagga. This variety of zebra is itself almost, if not quite, extinct: one, however, is preserved in the Derby Museum at Liverpool, and I have had the good fortune to see and photograph a young *burchellii* in the Amsterdam Zoo having the legs almost free from stripes. Intermediate varieties between the partially and the fully striped condition may be seen in the menageries at Antwerp and Berlin. These facts notwithstanding the quagga is a perfectly distinct species, recognisable from *burchellii*, as I have recently found, *by differences in the skull.*

The history of the decline and fall of the quagga is as follows:

Thunberg in 1773 met with it on the flats adjacent to the Zwartkops River, near the present site of Port Elizabeth. It then enjoyed a practically undiminished range, living out its life as it had previously existed—harmless and unharmed—for centuries. The first sign of the recession of the true quagga may be recognised in an observation made by Thomas Pringle in 1820. Pringle was not only an intimate friend of Sir Walter Scott, but was also himself a poet of considerable distinction: with the true regret of an educated man he laments the almost total disappearance of the quaggas and hartebeests from the open pastures of the Albany district, which they had formerly enlivened with their presence. Some twelve years afterwards the Cape farmers, according to Lieutenant Moodie, were employing meal sacks made of quagga skin, this custom persisting till at least fifty years later: Harris also mentions Boer shoes, home-made from the skin covering the hocks of this animal. By 1836 the quagga had become rarer, though still found on the great Karroo Desert and on the outskirts of Cape Colony: in the far interior it yet roamed in immense numbers. The hide-hunting Boers of 1850-70, however, attacked even the remoter herds, whose legions began to diminish year by

year, but little respite being given to the unfortunate animals, who were massacred both in season and out of season without any close time being afforded them.[1] According to Mr. H. A. Bryden the last two quaggas of the Great Karroo were shot in 1865, near the Tigerberg Mountain: and the once teeming myriads of the Orange River Colony only held out a few years longer, for when the late Mr. T. E. Buckley passed through their haunts in 1873, the true quaggas had already become "apparently unknown." According to Mr. Layard, however, dilapidated quagga skins, unfit for stuffing, were still obtainable in Capetown as late as 1875:[2] but by 1879, at latest, the true quagga had become quite extinct, and had gone to join the blaauwbok and the northern seacow in the melancholy list of departed species. So rapidly indeed was the true quagga exterminated that naturalists seem to have been utterly unaware of its impending fate till it was too late to try to save it: the Burchell zebra or bonte quagga also being called "quagga" in South Africa for the sake of brevity, has led some

1 Wasteful though they were of animal life, these tough old souls are said to have been quaintly economical of powder and lead, carefully cutting the bullets out of their slain quarry to serve again.

2 I have been informed that in this year some "half-striped" quaggas were still surviving—the last of their race—on a farm in the Hanover district of Cape Colony. A special inquiry which I made in 1900—greatly facilitated by the extreme courtesy and kindness of the Commissioner of Hanover—showed that neither in Hanover nor in Cradock can the true quagga *now* be found.

persons to suppose that *Equus quagga* is not after all extinct.[1] Unfortunately all reports of the existence of "that rare animal the quagga," published in later years, turn out on investigation to refer to some species of *zebra*: the subject of this essay is as extinct as the dodo.[2]

The extermination of the quagga is all the more to be regretted because it seems possible that it might have been systematically broken in to bit and harness like a horse, or indeed like its near relative the Burchell zebra during the last ten years. The first example which Sparrman noticed was a very tame specimen, pleased when anyone stroked its sleek sides and delighting to be caressed. On a subsequent occasion the doctor actually saw a quagga driven in the street harnessed with five horses: and with a rare fore-

1 One gentleman, writing as late as some five years ago to the scientific papers, to "correct" the assertion that the true quagga had been exterminated, observed that at the moment of writing a dead quagga (or its freshly stripped hide) lay outside the house. After the Boer custom of calling zebras "quaggas" had been pointed out to him, nothing more was heard of this "proof" of survival. Even in August, 1900, a tradition was current at Port Elizabeth that the true quagga was still preserved on a single farm in the north-west of Cape Colony: perhaps the animal had been confused with the black wildebeest under private protection in Victoria West. Any enthusiast wishing to investigate the truth of this rumour is welcome to attempt it: one can prophesy the result beforehand!

2 See also my letter to the *Field* of June 11, 1904. It may be mentioned that the name "quagga" being derived from the cry of the animal, should be pronounced kwā-hā (Boer fashion), not "kwagger," as is invariably done by naturalists in this country. I remember, when inquiring some three years ago for the specimen of this animal preserved in the Museum of the Amsterdam Zoological Society, the Dutch attendant did not recognise the name as rendered in English fashion. On my pointing out the specimen in its glass case, he at once recognised it, and pronounced its name "Kwā-hā."

sight far in advance of his age he urged the domestication of the species, pointing out that in his day it could be even more easily obtained than the horse, that it would of course eat the harsh grass of the country—its natural food—and that it would probably be immune from the horse-sickness. This excellent advice has been seconded by subsequent writers. Almost in Sparrman's own words, Harris says: "Doubtless it might readily be subdued by bit and bridle, and if not capable of universal distribution, would in its native regions at least, where food and climate are congenial, reward fourfold by its services, the trouble attendant upon its education." Would that his counsel had been heeded! The relations of white men with the true quagga during the long years that have elapsed between 1772 and 1879 are summed up in one word—extermination!

A few half tame specimens have been brought to Europe. The list is as follows:

1. A quagga was kept at Windsor during the eighteenth century: it was the property of the then Prince of Wales—probably Frederick, son of George II. As this individual is said to have been striped with black (not brown), it has been thought that the animal may have been a Burchell zebra.

2. The Royal collection of the Palais de Versailles once contained a quagga: after the

Revolutionary mob attacked the palace, the quagga, together with a hartebeest, a crested pigeon, a rhinoceros and a lion was sent to the Jardin des Plantes, these being the only specimens which escaped destruction.

3. In 1821 Frédéric Cuvier described another quagga in his "Histoire Naturelle des Mammifères." This animal also lived in the Jardin des Plantes menagerie, and died when about eighteen or twenty years old. Cuvier says that it was not inherently vicious, but inclined to be tiresome and obstinate, and ready on occasion with teeth and heels; thus being no more intractable than a spirited horse.

4. About 1815 Lord Morton obtained a quagga stallion and endeavoured also to secure a quagga mare. He tells us that he intended to domesticate the species, and it is unfortunate that the attempt should have failed, a female proving unobtainable. Lord Morton, however, by means of his quagga and a mare of 7/8 Arab blood, bred a curious female hybrid of a dun or chestnut colour, having faint stripes on the neck and shoulders and more pronounced ones on the knees and hocks. The mane of this hybrid was short and stiff: the tail though but semi-equine (being haired in the lower half only), was dark coloured, and not white like that of the quagga. The hybrid was apparently a vigorous and sturdy animal, and is

known to have lived for at least five years afterwards.

5. Lord Mostyn had a quagga stallion which he crossed with a chestnut mare: the resulting hybrid is mentioned by Charles Darwin, but nothing more is known about it.

6, 7. At some time previous to 1826 Sheriff Parkins used to drive two male quaggas (*not* a pair as is usually stated) through the streets of London harnessed to a light phæton: these beautiful steeds were often seen in Hyde Park and other fashionable places, and Agasse's portrait of one of them still hangs in the Royal College of Surgeons' Museum in Lincoln's Inn Fields. These quaggas unfortunately died while still in the prime of life; their bodies were presented to Mr. Joshua Brookes, a celebrated naturalist, whose museum was second only to the famous collection of John Hunter. The skulls are preserved in the Royal College of Surgeons' Museum, while Agasse's portrait has been perpetuated as a woodcut in the Encyclopædia Britannica, being employed to illustrate the article "Quagga," by the late Sir Wm. Flower.

8, 9, 10. Three quaggas (not two as is usually stated) have been exhibited in the London Zoological Gardens. The first specimen was purchased in 1831, and was probably one of the parents of the quagga hybrids said to have been

driven in harness between the Zoo and Covent Garden Market, early in the last century. It was also probably the animal drawn from life by Hamilton Smith, and figured in his work on the Equidæ, published in 1841. This animal died at some time previous to 1838, and its skin may be that referred to by Sir Cornwallis Harris in 1840, as being exhibited by the Zoological Society. The second quagga was purchased in 1851, and died in the summer of 1872. This individual—a female—was twice photographed in the last year of its life by Mr. York, and it has been stated by several naturalists that these photographs are the only sun pictures of a living quagga extant. Such, however, is not the case, as Captain Hayes' work on the "Points of the Horse" contains a reproduction of a photograph of the same individual—taken by Mr. Frank Haes. A copy of this photograph, presented to the Society by Mr. Haes, was exhibited by the Secretary at a meeting held on May 3rd, 1904. The third quagga was a male, which was presented to the Zoological Society in 1858 by the late Sir George Grey, and had to be slaughtered in 1864, it having injured itself by breaking down some boarding. It may be the animal specially drawn by Zwecker for the figure of the quagga in the Rev. J. G. Wood's Illustrated Natural History, published during 1861-63: at any rate the individual represented

is obviously a male, from the richness and extent of the markings, which differ materially from the paler ornamentations of the female, as shown in York's photograph. Zwecker has drawn the animal well enough, but the surrounding bush seems far too luxuriant, and the water scene does *not* suggest a pool on the open veldt, as delineated by Harris. An enlarged copy of one of York's photographs of the female now hangs in the new zebra house at the Zoo.[1]

11, 12. The thirteenth Earl of Derby had a pair of quaggas living in his famous menagerie at Knowsley Hall. The male seems to have been the individual mentioned by Darwin as being striped about the hocks—a unique occurrence in this species, indicating an approach to the zebra type of ornamentation. It appears to have died at Knowsley, for on the sale of the menagerie after the death of Lord Derby in 1851, only the female animal is mentioned in the catalogue which was issued by Mr. J. C. Stevens. This quagga mare was purchased for £50 by the late Dr. G. F. Westerman, and was sent to the Amsterdam Zoological Gardens, where she gave birth to an equine hybrid (Asiatic wild ass x quagga).

13. The Berlin Zoological Gardens once pos-

1 This photograph has been published as a lantern slide, and was included in the series of lantern photographs illustrating my lecture on the "Vanishing African Fauna," before the Selborne Society in 1899. The animal is in a standing position, apparently basking in the sun, and the characteristic half-striping is well shown.

sessed a quagga, but I have no information about the animal.

14, 15, 16. "Several" quaggas—apparently the last of their race to be sent alive to Europe—were obtained about 1870 by Mr. Bols, the Belgian consul at Port Elizabeth, and forwarded to the Antwerp Zoo: about the same time a very fine individual, which had lived several years at Antwerp, was purchased by Dr. Westerman for the Amsterdam Gardens. Had the impending extermination of the species been realised at the time, a last effort might have been made to save the race by breeding from the Antwerp animals, and so founding a menagerie stock: the wild quaggas then left in Africa were already in a parlous state, and probably all but exterminated. This last opportunity, however, was unwittingly lost: indeed I find that these animals have never bred anywhere in captivity. and the last of the imported specimens will by now have died from sheer old age.[1] It was probably the fine Amsterdam specimen of 1870 which, on its death, passed as a "duplicate specimen from a Continental Museum" into the hands of Heer Franks—himself resident in Amsterdam. The Dutch Zoological Society already possessed another stuffed

[1] This importation of 1870 is here emphasised, as I have seen it stated in a recent work by a well known naturalist that in *1864* the last specimen ever exhibited was received by the Zoological Society. 1864, however, was the year in which the skin and skeleton of the quagga of 1831 was purchased for the British Museum.

quagga—that purchased at the Knowsley sale—so that the 1870 animal would in any case be a "duplicate specimen"—a valuable asset to be profitably disposed of in the best market.

So much for the quagga in captivity. After laborious enquiry, it appears that the animal has never been exhibited in the Zoological Gardens of Bristol, Cologne, Dublin, Frankfort-on-Main, Hamburg, Hanover, Lisbon, Marseilles, or Rotterdam : therefore, on adding the few odd individuals formerly taken young by the colonists as curiosities (and not by wild beast merchants for export), the list is completed. It has not seemed worth while to compile a census—probably imperfect at best—of the few seen in Africa about the homesteads of their captors by Sparrman, Burchell, and others. The following is a list of specimens in museums, compiled after a lengthy correspondence with various scientific gentlemen in Europe, South Africa, and the United States, and I hasten to express my thanks to them all in this place. The tale of quagga relics is as follows :

1. A newly-mounted old skin of a quagga stallion has been placed in the Mammal Gallery of the Natural History Museum at South Kensington. It has been stated to have belonged to the male quagga presented to the Zoological Gardens by Sir George Grey in 1858, but a

careful examination of the skull ($1^a$) belonging to the skeleton of the same animal showed me that it was labelled "*Equus quagga*, the specimen mentioned in Waterhouse's Mam. of Mus. Zool. Soc. 1838, p. 37." It was purchased with the skin for the British Museum in 1864. The teeth *are much worn*. The specimen is doubtless the first quagga purchased for the Zoo in 1831. Sir George Grey's animal was a beast *in the prime of life*, slaughtered through grim necessity, owing, as we have already seen, to its self-inflicted injuries. The quagga skin which Sir Cornwallis Harris states to have been exhibited previous to 1840 by the Zoological Society, cannot have been that of Sir Geo. Grey's specimen: it probably belonged to the 1838 quagga above mentioned, or was perhaps a trophy brought home by Harris himself.

2, 3. I have examined the skulls of Sheriff Parkins' famous quaggas in the Royal College of Surgeons' Museum. Both are the skulls of young adult males, with the sutures unobliterated, and without any trace of the first premolar teeth. They were purchased for the College at the sale of the greater part of the Brookes collection, in 1828.

4. The Tring Museum contains a beautiful stuffed quagga mare: the markings are particularly distinct, and even the hind quarters are ornamented

with definite stripes passing downwards and forwards from the croup. I am informed that this quagga was originally sold mounted by Franks, but has since been re-stuffed for the Tring Museum. Perhaps it is the duplicate from the Amsterdam Zoo already mentioned.

5. The Science and Art Museum at Edinburgh possesses a stuffed quagga of unknown sex and locality, obtained in 1879 from a London dealer. I applied to its former owner, and as he kindly informed me that one of the Zoo quaggas had been purchased by him after its death, it is probable that the Edinburgh specimen is the quagga mare photographed in 1872 by York. The photograph represents a much duller coloured animal than the one at Tring; the stripes *disappear completely* on reaching the middle of the body, and the hind quarters are absolutely *without markings.*

6. The Museum of the Yorkshire Philosophical Society at York contains an articulated quagga skeleton, which is one of the first natural history specimens which I ever remember seeing: unfortunately no data relating to it have been preserved.

7. The Medical Museum of the Owens College, Manchester, contains an equine skeleton alleged to be that of a quagga. I have carefully examined this specimen, and think it is authentic: the skull

shows the stout nasal bones and squarish diastema which occur in the true quagga and thus differentiate it from the elongated nasals and oblong diastema seen in the skull of Burchell's zebra, the only species with which it is likely to be confounded.[1] Unfortunately no history is obtainable, though the Medical Museum collection appears to have been founded by the union of specimens from the old Manchester Natural History Society's Museum with others formerly kept at the Pine Street Medical School, near the Manchester Infirmary. Horns of other African animals—Cape hartebeest, blesbok, etc.—in the same series, as far as they go, seem to support the authenticity of this skeleton: but all further inquiry appears useless owing to the death in 1885 of Professor Morison Watson, M.D., F.R.S., in whose time the collection of the Medical Museum was arranged in its present situation.

8. The late Professor Cope formerly possessed a roughly-cleaned quagga skeleton, which he pre-

1 A few years ago I devoted some time in endeavouring to separate *Equus quagga* and *E. burchellii* by their osteological characters. The diastema or space between the canine and molar teeth (through which horse drivers insert the bit) is, when the jaws are closed, squarish in the quagga and oblong in *burchellii*. In the quagga the aperture of the posterior nares is wider and also more rounded than in Burchell's zebra, as seen in a photograph now before me showing the two skulls placed side by side. The three quagga skulls in London, together with that of the male specimen at Leyden, were examined in connection with this research. Naturalists of course have long been aware of the interest which attaches to the skeleton of the quagga, the nearest of all recent equines to the extinct Pliocene horses—*Equus quaggoides* and *E. stenonis*—of Europe.

sented to the Academy of Natural Sciences at Philadelphia, where it still remains. No data are known.

9. A half or three-quarters grown quagga stallion is preserved in the Natural History Museum of the Jardin des Plantes at Paris, and the late M. Alphonse Milne Edwards informed me that he thought it had been brought home from the Cape by MM. Péron and Leseur. This would fix 1804 as the date of acquisition by the Museum. It seems probable, however, that this is the Versailles specimen (No. 2 on the list of menagerie animals given above). It is evidently of great *post mortem* age, as it has been provided with the old-fashioned circular glass eyes used by taxidermists in the first half of the last century. This example was mentioned by Frédéric Cuvier in 1821 ("Histoire Naturelle des Mammifères"), and is probably the individual delineated in Cassell's Natural History: at anyrate, though well nigh a century old, it is in excellent condition, and well worth figuring in any standard work. The fully adult quagga described by Cuvier, which lived 18 or 20 years in the Jardin des Plantes menagerie, is not now in the collection. "Le Muséum ne possède qu'un seul individu d'*Equus quagga*."

10. The Leyden collection contains a quagga stallion obtained in 1826 on the borders of Cape

Colony, probably by Dr. Von Horstock: the perfect skeleton (10A) of the same individual is also in the Museum, and by the kindness of the museum authorities I have been enabled to photograph these very interesting relics.

11. The quagga mare, formerly in the Knowsley Menagerie, and afterwards purchased for the Amsterdam Zoological Gardens, is now preserved in the zoological museum attached to the latter institution. It has been very well mounted, the modelling being very good, while even the colour of the iris has been carefully reproduced, as shown in Waterhouse Hawkins' plate of the same individual during life. The hemione-quagga hybrid,[1] to which this Amsterdam specimen gave birth, does not seem to be in the museum: perhaps it died young, and the skin was not preserved.

12. A stuffed quagga is preserved in the Berne Natural History Museum. The Swiss authorities are apparently unaware of the great value of their specimen, and it is the only example I know which is not protected by glass from dust and injury.

13. The Zoological Museum at Turin contains a stuffed quagga and its skull (13A), obtained at the Cape in 1827. Probably this was collected by Dr. Von Horstock, who is known to have obtained a quagga at Steenbergen, on June

1 The hemione (*Equus hemionus*) is the Asiatic wild ass—the onager of Xenophon.

15th of that year. During the first half of the last century many European collections were enriched by the industry of Von Horstock, the British Museum being similarly indebted to Burchell and Sir Andrew Smith.

14. The stuffed skin and skeleton (14A) of the quagga formerly living in the Berlin Zoological Gardens, are now in the Natural History Museum of that city: and Dr. Möbius kindly informs me that the Berlin collection includes further specimens, namely, (15) a quagga skeleton, received in exchange from the Leyden Museum, and (16) a skull obtained by Mr. Krebs, in the Orange River Colony, or near the Liqua (=Vaal) River. No. 17 is a skull also at Berlin, and probably obtained by Krebs in or near the Orange River Colony. The old name of "Liqua River" being employed to indicate the locality would seem to show that the Berlin specimens were obtained previous to 1844, by which date the term "Vaal River" had come into general use.

18. There is a stuffed quagga, and its skull (18A) at Munich, purchased by Ecklon about 1835.

19. A stuffed quagga is also preserved at Mainz.

20. The Senckenbergian Museum at Frankfort-on-Main contains a stuffed quagga, and its cranium (20A) collected in 1831 in South Africa—perhaps by Dr. Smuts, whose dissertation on the Cape mammalia was published a year later.

21. The female quagga, which the authorities of the Vienna Museum purchased in 1836, is a very remarkable example, the ground colour of the head being clay-brown, while the rest of the upper parts are creamy buff. The dark stripes are *relatively broader* than usual, and seem to extend further towards the hind quarters. This specimen is also larger than the other quaggas now in preservation. Unfortunately there is no skeleton preserved with it. A photo-engraving of the Vienna quagga appeared in the Proceedings of the Zoological Society for 1902.

22. Equally interesting is the Stockholm quagga —the only fœtal specimen known! This somewhat battered example is also the most venerable of all the quagga relics, having been brought home by Dr. Sparrman in 1776. A photograph kindly forwarded to me by Mr. F. A. Smit shows that the coloration is much the same as that of an adult quagga: the mane appears to have been lost. Measurements as published by Dr. Sparrman: ears to tail, 31 inches; height at loins, 22 inches.

23. At some time previous to 1862 Mr. A. Dale of Beaufort West presented a quagga foal—probably one of the last quaggas of the Great Karroo Desert—to the South African Museum at Capetown. This animal is also of special interest, being the only *foal* now in preservation! Young

quaggas, like young zebras, were rough coated: this point is well brought out in a photograph of this specimen, kindly sent to me by Mr. W. L. Sclater: a figure of the same individual was published some two years ago in the *Cape Times*. The mane of the Capetown quagga seems to be of an almost uniform brown, with only scanty indications of the usual white bands: otherwise the markings are much the same as in adults.

24. A quagga skin, brought home by Mr. T. Cooper with other curios in 1860, was sent by him to be sold at Stevens' Rooms about eighteen years later, and Mr. Cooper suggests that this may have been the skin purchased in 1879 for the Edinburgh Museum: but, as has already been seen, the Edinburgh specimen was probably an animal which died in the Zoo.

25. On August 22nd, 1899, a "skin of quagga *now extinct*" appeared as lot 240 of a series of natural history specimens sold on that date at Stevens' Rooms. On inquiry I learnt that the skin had been sent to be sold by a dealer who had purchased it with some other curios from a gentleman returned from abroad, so that it had probably been imported direct from South Africa. I have not been able to examine or authenticate this skin, nor do I know who purchased it at the sale.

The above completes the census of known

remains of *Equus quagga*.[1] This extinct species is not represented in the museums of Aberdeen, Brussels, Breslau, Chicago, Copenhagen, Dresden, Dublin, Durban, Florence, Geneva, Grahamstown, Hamburg, New York, Oxford, Prague, Pretoria, Pietermaritzburg, and Washington. Save for the few specimens just enumerated, and perhaps some odd meal sacks of tattered hide yet remaining in remote Dutch homesteads, it has passed away for ever.

A miserable history of extermination has been herein narrated: now for the application thereof. Immense enthusiasm marked the commencement of ostrich-farming at the Cape in 1865-70: had similar zeal been exerted, even at that late hour, to save the true quagga, it might have been profitably domesticated, and surely a Colony which has saved the ostrich for the sake of its feathers—mere ornaments at best — might have bestirred herself to preserve the quagga for far more practical purposes. To enumerate the possible virtues of a domesticated race of quaggas would be but slaying the slain; but it is sad to reflect that

[1] It appears that the young quagga ("isabella quagga" of Hamilton Smith) presented by Burchell to the British Museum, is no longer in the National Collection, and has probably been destroyed. Dr. Gray tells us that it was nothing more than a young specimen, with nearly all the fur rubbed off. This individual was probably the male of the pair shot by Burchell's Hottentot attendant, Speelman, at Groote Fontein, on November 14th, 1811. It was figured in 1841 by Hamilton Smith in his work on the *Equidae*.

the repeated recommendations of naturalist after naturalist were allowed to pass practically unheeded. Sparrman's advocacy of the domestication of the species has already been noticed: in 1801 Sir John Barrow observed of the quagga "It is . . . . well shaped and strong limbed, not in the least vicious, but on the contrary is soon rendered by domestication mild and tractable: yet, abundant as they are in the country, few have given themselves the trouble of turning them to any kind of use." Burchell's vivid description of a quagga foal which voluntarily followed a horse into Klaarwater, allowing itself to be freely handled, demonstrates clearly enough that taken young the species might easily have been domesticated. Cuvier expressed the hope—nay, the expectation—that it would soon be regularly broken to harness. He justly observed, "when we consider that this species is capable of highly beneficial services in a domesticated condition . . . . we may naturally be surprised that the Couagga has been suffered by us to retain its liberty so long." His hopes were not realised. Harris in recommending the subjection of the quagga remarked on the indolence of the colonists in not essaying so tempting a task. And so on to the end of the chapter: save for the laudable but isolated efforts of Lord Morton, Sheriff Parkins, and one or two others, no attempt was made to

utilize the splendid capabilities of the animal. Immune alike from the tse-tse disease and the horse sickness, the quagga might have served as an efficient substitute for the horse in unhealthy localities, as suggested for Grèvy's zebra in a previous chapter: now it is too late. Truly indeed:

"The evil that men do lives after them,
The good is oft interred with their bones."

It only remains to express the hope that the fate of the quagga may serve as an object lesson, and that the recent efforts to protect the remnant of the South African fauna, as indicated by the new Government regulations and by the formation of a Game Preservation Committee at Pretoria, may meet with lasting success. But if not: *Ex uno disce omnes!*

# THE EGYPTIAN JERBOA.

The remarkable little rodents known as jerboas are mainly Asiatic and African in their distribution, although a few forms occur also in Europe. Their extraordinary appearance and quaint habits together with their small size renders them pre-eminently suitable as pets, and one species in particular—the Egyptian Jerboa—is now sold in such numbers in this country every summer, that but little apology will be needed for devoting a few pages to a consideration of its form and habits.

The Egyptian Jerboa *(Dipus orientalis)*[1] occurs in considerable abundance in North Eastern Africa. It measures about 14¾ inches from the snout to the tip of the tail, only about 6 inches of this measurement being taken up by the dimensions of the head and body. Rat-like in appearance, sparrow-like in movements, the jerboa's rotund person is absurdly supported on an attenuated pair of hind legs, and propped up when standing by a flexible tail, curved in an S-shape with the tip closely pressed against the ground. The head is short, the muzzle broad, rounded and truncated: the eyes, separated by a

1 A smaller light-coloured species (*Dipus jaculus*)—the dwarf jerboa—occurs near Alexandria with the larger one. The dwarf jerboa was aptly described by Hasselquist as "*mus aegyptius pedibus posticis longissimis.*"

EGYPTIAN JERBOA.

The forelegs are so short as to appear absent. In the standing position the S-shaped tail forms an efficient support.

wide interspace, are large, intelligent, and as beautiful as those of a gazelle. The forelegs are so tiny, and held so closely pressed to the body, as at first sight to appear absent: the hind legs are stilt-like, and terminate in three toes; the long tail is betasseled with a squarish and flattened tuft of elongated hair. The jerboa is one of the many mammals which suffer at the hands of taxidermists, and of artists who do not draw from life; museum specimens are too often wrongly mounted, the tail being absurdly shown as a limp and useless-looking appendage, instead of possessing the beautiful S-shaped curve seen in the living animal. The colour of the Egyptian jerboa is more or less dark fawn above and white below: the tail-tuft is black, with a white tip. A glance at the illustration will show that the Egyptian jerboa—despite its small size—is as extraordinary as any of the rest of the extraordinary animals of Africa—worthy to rank with the giraffe, the okapi, and the aard vark[1] as one of Nature's vagaries.

Jerboas are desert-haunting animals, and make their burrows in sandy or clayey soil. Four long tunnels converge to a central chamber, which serves at once as a refuge and a sleeping apartment, and several individuals

[1] The Aard Vark is an African anteater, fully described in this book.

often share the same retreat. During the greater part of the day the jerboas remain hidden in their subterranean homes. They will, however, occasionally emerge for a short time, even during hot sunshine, and captive specimens will snatch a little food at such times. At night they become very active, leaping and running with great rapidity: they retain their liveliness till daylight, when the early traveller may see the desert alive with jerboas, scudding in all directions. Ain Chegga, a caravanserai 61 kilometres from the oasis of Biskra, on the northern edge of the Sahara Desert, is famous for its jerboas, which abound in the vast treeless basin where the caravanserai stands.[1] These animals are said to be good eating, and are much appreciated by the Arabs, who take them by stopping up three of the entrances to their underground nest, and netting the fourth: on the central apartment being broken into, the animals bolt into the netted burrow, and are easily taken. The fennec fox and the caracal lynx are said to prey largely on these little rodents.

The first jerboa brought alive to England appears to have been the specimen—living in

1 In 1903 I found the country surrounding the oasis to be almost absolutely sterile, save for a scanty covering of dwarfed bushes: the traveller crosses many dried-up watercourses, and observes numerous ranges of barren, rocky hills. In these regions the Egyptian jerboa (or an allied species) not only maintains life, but is exceedingly abundant.

London—figured by Edwards in his "Gleanings of Natural History," in 1758. About thirty years afterwards Sonnini attempted to bring six over: but three died, one after another, before he had left Alexandria, and two more perished during a stormy passage to Rhodes, whilst the last survivor was believed to have been killed by cats after its arrival at that island. One therefore can well believe that Sonnini credited the Egyptian jerboa with a very frail constitution, and can understand his careful directions to those who might subsequently endeavour to bring such (supposed) delicate subjects to Europe. In later times, however, dozens of these little creatures have been safely imported: a male jerboa was received at the London Zoo in September, 1861, being the forerunner of a long list of specimens since exhibited there: some young ones were born in the Gardens on April 27th, 1871. At the present day these animals are captured in great quantities for sale in Europe as pets, and may be seen in the dealers' shops. The following account is from observations on about a dozen individuals living in captivity during 1903-04.

After leaving its sleeping-apartment at twilight, the jerboa sits quietly outside its box for about ten minutes or longer—wide awake, but motionless, as if meditating. The animal then commences

its toilet, polishing up its little face assiduously with the tiny forepaws, and paying much attention to its tail, the terminal tuft of which is most carefully smoothed and also parted down the middle in the most comical fashion. The animal also stretches itself at full length on the floor of its cage, the hind legs being first extended far behind the body, and then flexed in a most surprising way, so as to extend beyond the muzzle. Food is the next consideration: millet seed, crushed oats, and green stuff are taken readily, the food being held between the front paws in true rodent fashion. Jerboas drink by rapidly scooping the water into their mouths with the tiny forepaws: this action is very difficult to detect, as it is executed with such rapidity that a careless observer would conclude that the animal was lapping with its tongue like a dog.

After toilet and refreshment comes exercise. The animal runs lightly about its cage, moving each leg alternately with such nimbleness as to recall the graceful walk of some shore-frequenting bird, and abruptly stopping here and there to examine some object in its path. If a scrap of food be found, it squats down to eat without more ado—then flits on like a shadow in the fast-gathering gloom, more like a wee sprite than an animal. With increasing darkness the jerboa

becomes yet more lively, frisking and dashing about with marvellous speed.

These animals when turned into an out-door enclosure progress by a series of tremendous leaps, the long tail streaming behind to act as a counterpoise to the forwardly-directed head and body. When allowed full liberty, they bounce over the ground as if made of india-rubber, making springs six or seven feet long, and escaped animals may have to be recaptured by strategy, since the lightning speed at which they travel renders direct pursuit hopeless. Jerboas are very fond of ploughing up the sand or sawdust of their cage with their snub noses,[1] and heaping it up into little mounds: they also are very destructive to woodwork, rasping persistently at the same place night after night, till a large ragged hole has been gnawed in the wood. When nibbling at an object near the floor these animals lie almost prone and turn rapidly this way and that, their gleaming white bellies recalling the struggles of some silvery fish, a semblance heightened by the rapidly-jerking tail. Tame jerboas become bold enough to nibble their owner's fingers: they do not, however, relish being picked up, kicking and struggling and inflicting incidental scratches with the long claws on the hind feet. These animals

1 The nostrils of the Egyptian species are protected during this ploughing operation by a thickened fold of skin.

seldom bite, though an escaped jerboa which has run into a hole will nip the finger if grasped incautiously: they often grunt if disturbed when asleep.

Few persons, on viewing the disproportionate length of the fore and hind limbs in these animals, would suppose them to be good climbers. Nevertheless, scrambling up the wire fronts of their cages is a favourite amusement of captive individuals, and they will jump off quite recklessly when they have climbed up as high as they can. A fine female who broke her leg from this habit persisted in struggling up again with one limb rendered useless, and in spite of this wilful behaviour did not die for a week after the injury, eating well, and hopping about during the interval. Jerboas can climb curtains, and they will also scramble down from a considerable height, as if trusting to the sand of the desert which they once inhabited, to break their fall.

A mysterious disease is quite prevalent amongst jerboas. The affected animal becomes progressively emaciated week by week, though it still runs about as usual, and will feed even up to within twenty-four hours of its death. The fur in good health is wonderfully sleek and glossy: in sickness the coat becomes rough and staring, and though the wasting of the body may not be

evident to the eye, the invalid's legs and tail will be seen to be woefully thin as compared with those of a healthy jerboa. These animals often die one after the other of this wasting complaint, so that it may be directly communicable from a sick to a healthy animal. A post-mortem examination made on the body of one victim revealed no obvious changes in the viscera. The zoological pathologist in the investigation of this disease will find a new field for his labours. Tubercular disease on one hand or coccidiosis[1] on the other, may be responsible for the mortality.

Apart from a liability to this disease, jerboas seem to be tough enough : and when in health they require no more care than so many rabbits. Their appetites are hearty, and they will readily take crushed oats, millet seed, bread, cabbage, and lettuce, whilst water should also be given them—in an unspillable vessel, as damp surroundings are injurious to these denizens of the hot Sahara. All woodwork must be protected from their mischievous teeth by a lining of sheet-iron, but they may be allowed to exercise their jaws by stripping the bark from a branch thrown into the cage. Sand or sawdust should be freely sprinkled over the floor of their compartment, sawdust (as being warmer to the animal's feet) being prefer-

1 Coccidiosis is a parasitic disease due to the presence of minute sporozoa in the liver or intestine, and is so fatal to rabbits, that it might prove useful in reducing the Australian rabbit plague.

able in a northern climate. Sleeping accommodation may be conveniently provided by means of a tin box, lined with dry grass, and having a hole cut in one side to allow the ingress and egress of the jerboas: a *wooden* box will be speedily gnawed into fragments. By way of affording amusement and occupation to the animals, a little dry hay or old sacking may be placed on the floor of the cage: the jerboas will, after speedily gnawing the former into fragments, and teasing out the latter into shreds, carry both impartially into their bedroom, to serve as a couch. In consideration of their active habits, these animals should be allowed plenty of room and a run nine feet long by three feet broad will not be found at all too large for a pair; the cage should not be lofty, lest the jerboas injure themselves by jumping off the wire front after ascending to a considerable height.

If well fed and warmly bedded jerboas can be wintered indoors without artificial heat: damp alone appears injurious to them and makes them lethargic and even semi-torpid. It would probably be easy to acclimatise the Egyptian jerboa in England, since a specimen which escaped on February 4th, 1903, and was found killed by a dog two days later, had its stomach full of vegetable fibre, showing that it was well able to look after itself. Such an experiment would, how-

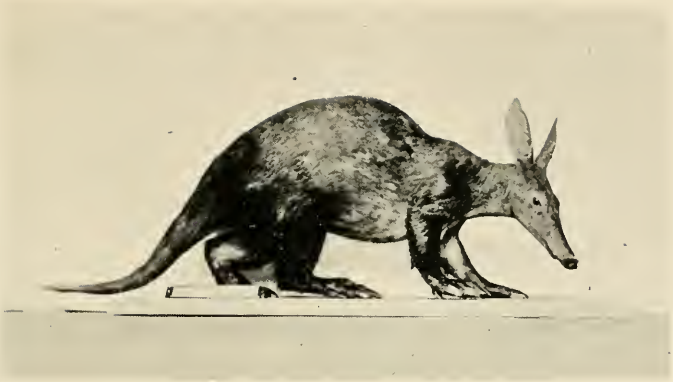
ever, have no practical object, unless indeed as introducing a new food animal! Besides, the animals might prove inconveniently prolific, and the story of the Australian rabbit plague needs no repetition to enhance its value as an object lesson.

Treated as menagerie exhibits jerboas might be kept out of doors all the year round in a very large enclosure, with a floor of cement or other impermeable material covered with a few feet of gravelly soil, so that the animals could burrow without escaping: one or two snug indestructible metal boxes, warmly lined with hay, might also be provided for sleeping in, as an alternative to the burrows constructed by the jerboas. In an enclosure of generous size the animals could forage for themselves: but if the commissariat were to break down, food might be easily given in the ordinary way. Visitors to the Jardin d'Acclimatation, at Paris, may remember how well the prairie dogs and Patagonian cavies flourish under such an out-door *régime*. It is probable that so hardy an animal as the present species would do as well if not better than either of the species just mentioned, and that it would increase and multiply, living happily in a state of semi-freedom as one who has found "a home from home," rather than as a stranger in a strange land. At any rate, such an interesting experiment would be well worth trying.

## THE AARD VARK.

The splendid Zoological Gardens of most European capitals are an important factor in the spread of education. To Englishmen the London Zoo, founded in 1828, is the most familiar of these institutions: but there are many flourishing sister establishments dotted over the Continent of Europe. The menagerie at Paris in connection with the Jardin des Plantes is the oldest of all, having been founded as early as 1809 by M. Geoffroy St. Hilaire.

The Amsterdam Zoological Gardens was also established many years ago, being founded in 1837: it has several times been enlarged and now extends over more than twenty-five acres. In 1902 this menagerie contained many rare species, including the maned wolf of Brazil, the Australian echidna or porcupine anteater, and the lesser bird of Paradise from New Guinea. Antwerp again has a fine zoological collection and amongst its exhibits may be mentioned the European bison and the West African short-horned buffalo. The magnificent Berlin Zoo with its rich series of 25,000 living creatures, is well worthy of the great nation of students which it represents: the naturalist will find much to interest him in



AARD VARK.
Killed near Durban and now in the Manchester Museum.

this incomparable exhibition, which includes the musk ox, the Cape zebra, and other rarities.

No province of the management of these numerous institutions demands more resourcefulness than the task of obtaining the rarer animals, together with the due care of them when they have arrived at their destination. The haunts of most species are so remote that the mere journey thither forms a considerable item in the expenses, and even when arrived at the spot the traveller's efforts may be hindered by war, fever, or the difficulty of transport. Hence many creatures (such as the cobego or flying lemur) remain practically unknown, save as museum specimens. Other animals are of a delicate constitution, and too frequently reach Europe only to die, *e.g.*, the gorilla, the slender loris, and the elephant shrew.[1] Others again cannot be suitably fed on the voyage, so that they are never sent over—the Australian marsupial mole for instance. The members of one group of animals—the anteaters—seem to perversely combine in their constitutions the several difficulties which perplex the wild beast merchant *en route* and the purchaser after arrival. Not only do these anteaters inhabit remote regions, whence it is costly to bring them, but being accustomed to live in a hot country they require

1 Four elephant shrews—animals exceedingly rare in captivity—were safely landed in England in June, 1904.

careful protection from the muggy climate of Europe: whilst the task of providing proper food for them, especially on the voyage, is a tax on the ingenuity of the most accomplished naturalist. The American species consist of the great anteater *(Myrmecophaga jubata)*, the tamandua anteater *(Tamandua tetradactyla)*, and the two-toed anteater *(Cycloturus didactylus)*. We also include in this category the African ant-bears, for although not closely related to the American forms, they are equally difficult to bring over and to maintain in confinement after arrival. The African anteaters consist of two forms: the Ethiopian ant-bear *(Orycteropus aethiopicus)* and the Cape ant-bear *(O. afra)*, known to the Dutch as the Aard Vark.

The Aard Vark—goup of the Namaquas—takadu of the Basutos—isambane of the Swazis and Zulus—measures from five and a half to six feet from the tip of the snout to the tip of the two foot tail, and stands one foot two inches at the shoulder,[1] being about the size of a large pig. The elongated head ends in a swine-like snout: the ears are large and naked: the tapering tongue can be protruded several inches from the mouth, is worm-like and covered with viscid saliva. The neck of the aard vark is very short: the

[1] As no shoulder measurements of the aard vark have hitherto been published, the above is taken from the mounted example in the Manchester Museum.

body is stoutly built, and is supported by muscular though stumpy legs: the feet are provided with strong claws. The tail, thick at the base, is cylindrical in section, and tapers gradually to a point, thus resembling that of a marsupial: indeed, when sitting erect on the tripod formed by its hind legs and tail, this anteater does resemble a clumsy caricature of a kangaroo, the similitude being heightened by the long face and pointed ears. The general colour of the hide is brownish, tending to reddish on the back, and becoming orange below: the skin is sparsely covered with bristly black hair, more abundant in young adult animals, though the *newly born* aard vark is flesh-coloured and quite hairless. It may here be mentioned that the Cape ant-bear is readily distinguished from its Ethiopian cousin by its straight facial line and thick elongated nose, which contrast markedly with the shelving forehead and attenuated snout of the northern species. The weight of a Cape ant-bear, which died in London many years ago, was stated by Dr. Crisp to be about 90 lbs.

The aard vark is the "Earth Hog," first described by Kolben in 1733. Pallas also has left a description of a very young one, which was preserved in the Museum of the Prince of Orange in 1788. Young animals have the tail relatively shorter than in the adult:

otherwise, save for the absence of a hairy covering, there is no striking difference between the external characters of the young and those of their seniors. A very young example is preserved in the Royal College of Surgeons' Museum.

The first specimen seen in Europe appears to have been the skin (accompanied by a sketch of the living animal) sent over by Col. Gordon: while in 1812 another individual was exhibited stuffed at Bullock's Museum (now the Egyptian Hall, Piccadilly). Probably one of the oldest examples *now* in preservation is that brought home in 1814 by Dr. Burchell.[1] It is exhibited in the Mammal Gallery of the Natural History Museum, at South Kensington, and does not seem to have deteriorated much in spite of its great *post mortem* age: it is badly stuffed, however, for the taxidermist has not reproduced the arching of the back, so characteristic of the *Orycteropodidae*.[2] Since Burchell's day the Cape ant-bear has been briefly noticed by many writers —Moodie, Smith, Harris, and a host of others— but on account of its nocturnal habits is even yet but little known. Apparently, however, the animal is still abundant, as travellers have reported

1 This specimen will be found figured in the Rev. J. G. Wood's "Illustrated Natural History."

2 Burchell's specimen is probably a young adult, judging from the fairly thick coat of blackish brown hair: in old animals the coat becomes scanty.

that acres and acres of land may still be seen riddled with its holes.

The chief interest attaching to the aard vark in the wild state is due to its burrowing powers. Owing to its immense strength the animal can sink into the hardest soil, tearing away with its forefeet and throwing the earth rapidly backwards with the hind ones. It frequently commences its burrow at the root of some bush, the branches of which will effectually screen the aperture; but if not satisfied with the site abandons its labours, and seeks some other situation. Once hard at work however, the animal digs with great energy, tunnelling along for perhaps thirty feet before finally excavating the roomy chamber which will serve as bedroom and citadel combined. Living armadilloes can generally be seen at the Zoo, and anyone who has observed the enormous strength and energy which these little edentates put into their burrowing operations will readily comprehend that such will-power and muscle, multiplied five-fold in the case of the aard vark, is not readily outmanœuvred. Moodie indeed states that one of these ant-bears, whose hind foot had been noosed in a thong, could not be dislodged from its burrow by four or five men: and it has repeatedly been found that the task of digging out an aard vark is arduous and exhausting, the labour continuing for

hours, and the anteater progressing at least as fast as his pursuers can dig.

The ant-bear employs its great claws not only in carving out its subterranean home, but also in obtaining its food. Although so bulky an animal, it subsists entirely on termites—the so-called "white ants"—which are only too abundant in Africa, where their destructive habits constitute them a veritable plague. There are many species of these insects, which live together in colonies, and inhabit elaborately-constructed ant-hills encased in a hollow clay shell of varying shape and size, some being conical and others domed. The mounds often attain a height of ten feet, and are extremely hard, besides being so strong that they will support the weight of a buffalo, a mounted man, or a giraffe. On breaking through the external wall of sun-baked clay, the ant-hill proper is seen to be a wonderful structure, honey-combed with galleries, and containing in the centre of all the queen ant, a loathsome creature about two or three inches long, whose head and thorax are but of the usual size, though her white abdomen is hugely swollen with eggs, which she can lay at the rate of sixty per minute, or eighty thousand a day! The tasks of the ant-hill—excavation, foraging, and so forth—are done by the swarming population of worker ants, which though of very small size can employ

their saw-like mandibles in a very business-like and destructive fashion, as many an African traveller has found to his cost.[1] The soldier ants, though forming but a hundredth part of the community, are nevertheless of great importance. They protect their fellow-termites, and are even better armed than the workers, their huge and heavy heads being garnished with sharp pincers which they do not hesitate to use as fighting weapons, hanging on with a bull-like tenacity which does not relax even in death. Perhaps, however, the most remarkable fact about these insect communities is the circumstance that all the individuals composing them are blind, so that they prefer to work in the dark, making little covered passages along which to travel when outside the anthill: if kept exposed to sunlight, they die.

The ant-bear takes little account of the termites' stronghold, whilst his thick hide is abundant protection against the bites of its warrior sentinels. With his great claws he tears down the side of the external dome, its stony hardness dissolving into powder before so powerful an attack: then penetrating to the citadel thrusts his long snout into every crevice and cranny, swallowing the termites wholesale, his twelve-

[1] I have recently seen the remains of the square lintel of a door (formerly built into a Government Office, at Jamestown, St. Helena) completely ruined by termites. These destructive insects had tunnelled great galleries in the wood, and had reduced it to a ragged, unsightly mass.

inch tongue being covered with a glutinous secretion, to which they adhere like sparrows on a birdlimed twig. Thus an animal which, seen amid the unnatural surroundings of a menagerie, appears ridiculous in shape and awkward in movements, when allowed to follow its natural inclinations at once exhibits the most beautiful adjustment of structure to environment. The claws of the aard vark make short work of the sun-baked walls of the anthill: the elongated snout is a perfect instrument for exploring the recesses of the termite city: whilst the stout tail forms with the hind legs a tripod, supported on which the ant-bear tears down the toughest ant-hill with ease and rapidity. Finally, the long ears quicken the sense of hearing, so that no foe can steal unawares upon the ant-bear engaged in its task.

In consideration of its nocturnal habits, its great strength, and the difficulty of supplying it with proper food, to say nothing of the Herculean task of extricating it from its subterranean stronghold, it is not surprising that the aard vark is but seldom brought alive to Europe. The first living specimen ever seen in England was the fine male received at the London Zoological Gardens in June, 1869. This individual had been taken at Port Elizabeth, near Algoa Bay, and was purchased for £150. The food

problem had been so satisfactorily solved during the voyage by a liberal diet of raw pounded meat, that the animal arrived in London in splendid health: he was followed in October of the same year by a female obtained in the same locality, and a third example was deposited in the Gardens in 1872. The original specimen lived at least ten years in England: in 1870 he was given a male Ethiopian ant-bear as a companion, the two bachelors agreeing well together, and affording naturalists the only opportunity hitherto recorded of comparing the two species of African ant-eater side by side during life.[1]

During 1900-02 no less than ten aard vark were offered for sale, but although duly advertised by their owner nothing further seems to be recorded of any of the members of this very large series. The labour of capturing and feeding this great number of troublesome animals must have been immense, and that so many were offered speaks well for the perseverance of those concerned in the enterprise.

It will have already appeared from this essay that the inconvenient size and high price of these animals together with the great difficulty of managing them will effectually prevent them from

1 The Ethiopian aard vark is even rarer in captivity than the Cape species, but the Paris Museum of Natural History contains a fine example of the former which died in the Jardin des Plantes menagerie.

becoming at all common in captivity: the food question also is an important matter. It is true that the aard vark has been kept in excellent health on a mixed diet of fresh raw minced meat and bread and milk, with an addition of raw eggs, but a daily supply of such food obviously requires considerable trouble in preparation besides being somewhat expensive into the bargain: the ordinary menagerie animal—monkey or deer—is satisfied with a much less complex diet. Although thus unsuited to the ordinary lover of strange pets these ant-bears from their grotesque appearance and rarity are extremely interesting; and are desirable additions to the Gardens of learned Zoological Societies whose resourceful care and painstaking attention will suitably maintain them.

Sherratt and Hughes
London and Manchester
1904.

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